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The International University of Sarajevo (IUS) is offering a great opportunity to MA, MSc. and PhD students to enjoy the pleasures of having a place in the first IUS Graduate Conference. Since 2004, IUS has been serving the region with its full academic and research potential and growing facilities. Three faculties at IUS allow students to study and research on arts, humanities, social sciences, natural and technical sciences. Among many other research and academic activities IUS aims, with this conference, to put into the perspective graduate studies and young researchers and their scholarly ideas and contributions.

This conference will indeed reflect the University's interdisciplinary and international character. This two-day conference will provide a platform for graduate students in arts, humanities, social sciences, natural sciences and technical sciences to present and exchange their ideas in an international and interdisciplinary environment. The organizing committee plan to invite two internationally renowned academicians from different disciplines as keynote speakers.

This graduate conference will focus on the wide range of topics related arts, politics, sociology, history, culture, psychology, English language, visual arts, economy, management, genetics, architecture, biology and engineering sciences. Students who present their researches will receive feedback from distinguished researchers and academicians who will evaluate submitted papers.

The main aims of the conference is to tackle current social, political, economic, and scientific issues in a context of present graduate research and studies, exchange views, experiences and findings among graduate students locally and from abroad, make a platform for young researchers and graduate students from Bosnia-Herzegovina, region and the world to network themselves through this conference.

Yasin Demirtaş
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Part I

Psychology

Tensions in Intercultural Videoconferences: Using the Relational Dialectical Framework to Analyze Intercultural Videoconferences

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ABSTRACT

The present study is focused on analyzing the relational contradictions that take place during intercultural videoconferences (IV). According to Wang (2001), there is no such thing as perfect plan in an on-line learning environment. Wang also claims that considering the diversity of the global internet society, cultural sensitivity and flexibility are essential to collaborative virtual classroom success (p. 519). Similar to Wang, other scholars (Lenard, 2005, Chang and Lim, 2002) described the process of IV without applying any theoretical framework in their analysis. Therefore, considering the fact that most of the current IV literature is atheoretical, the author decided to contribute to the IV studies by applying the framework of relational dialectics. Method used in this study consists of IV observations and interviews that were conducted with professors who organized and participated in IV. The study presents four contradictions which derived from data analysis. These were examined with dialectical strategies offered by Baxter and Montgomery (1996).

Key words: dialectical tension, intercultural, videoconferences, communication.

When you do a videoconference you see what they want you to see and nothing more. So, it is restricted. DON (the professor)

Literature Review

Teleconferencing in Learning (CMC)

Bannan-Ritland (2002) did a review of studies related to computer-mediated communication, e-Learning, and interactivity. She also provides other scholars' definitions about these notions, as follows; e-Learning was defined as the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance (Rosenberg, 2001, p. 28, cited by Bannan-Ritland, 2002, p.162). On the other hand, computer-mediated communication (CMC) is defined as "communication between different parties separated in space and/ or time mediated by interconnected computers" (Romiszowski & Mason, 1996, p. 439, cited by Bannan).

Online learning and courses were well explained and illustrated by Isman and Altinay (2005), two Turkish scholars. They demonstrated the professors' and students' perspective related to online programs, furthermore, they provided readers with the advantages and disadvantages of online learning.

Lenard (2005) states that even though the computer-assisted discussion may not make the classroom "egalitarian," it encourages increased student participation. On the other hand, Wulf and Schinzer (1998), German scholars, did a pilot study on lecture and tutorial via Internet. Their

main findings were that the teleconference leads to a lower level of attention interactivity, and maintaining the focus of discussion. These two studies have a great contribution to the present study by explaining the advantages and disadvantages of eLearning.

Two other studies concentrated on the elements of e-Learning. They analyzed face-to-face interaction and teleconference interaction in eLearning. Chilcoat and DeWine (DATE?) concluded that physical appearance has a great influence on conference participants' perceptions in both face-to-face and teleconference interactions. Similar to this study, Smeltzer and Vance (1989) analyzed the effect of graphics used in teleconferences. They came to conclusion that graphics improve the effectiveness of a teleconference message. This research is important to the present study, because it explains the importance of the elements of teleconferencing, thus helping practitioners navigate these new learning environments successfully.

Only a handful of studies have been done in e-Learning and computer-mediated communication. Internet has started to play an important role in today's classroom environment, and both professors and students are very aware of this new reality. The present study will contribute to what we presently understand about computer-mediated communication in classroom environments.

Intercultural Communication in Videoconference

The study done by Chang and Lim (2002) provides us with an additional view of intercultural communication and videoconferencing. Their main conclusion is that ALN (asynchronous learning network) performance is affected by different cultural context (individualism-collectivism). On the other hand, Benbunan-Fich and Stoever (2003) did a study of international business (IB) course. In the context of International Business course, the communication tools helps bringing multi-cultural perspectives of peoples from different countries and locations into a case discussion.

The research conducted by Graf (2000) describes the importance of intercultural videoconferences. A virtual environment was created for one German-Japanese class, and a whole class time period of 8-12 weeks was organized. The study supports the notion of distance learning and suggests that we should not be afraid by the cost of equipment and the amount of time spending during the implementation of on-line class.

The purpose of the Wang (2001) study was to discuss the role of effective intercultural communication and collaboration in the web-based collaborative learning community.

According to her, communication among people of different cultures, societies, and backgrounds is challenging. Collaborative communication across cultures in the online environment requires the willingness of community members to listen, to respect, and accept different perspectives; to accommodate and negotiate in order to reach shared meanings; to be flexible in their acceptance of ambiguities; to provide mutual respect, trust, and support; to develop cultural sensitivity.

Since the present study is specifically concentrated in intercultural videoconferencing, all of the mentioned studies together with definitions and significant findings are important because they each contribute to our understanding of this new phenomenon. However, they are not studied by using any theoretical background. However, the present study will use dialectical tensions lenses to analyze the data. The following section will discuss more about relational dialectics, the elements and strategies of this theory.

Dialectical Tensions

- The Origin

The origin of dialectical theories started in 1920, and one of the main pioneers is the Russian intellectual Mikhail Bakhtin. Bakhtin's rather dense body of work concentrates primarily on dialogue,. According Bakhtin (1984), in order to have a dialogue, the members need to combine their personal viewpoints with others' while keeping the uniqueness of their individual viewpoints. Furthermore, the members create a unity in conversation but through two different voices (Baxter & Montgomery, 1998, 24-25).

Bakhtin mentioned two opposing forces that are present in language interactions. One is centripetal (unified), which is a force of single language and the centrifugal (diversifying), the forces of a large number of voices. Language is characterized by combining these two opposing forces. Bakhtin called this interaction as "contradictory and multi-languaged world" (As cited by Prentice & Kramer, 2007, p. 340).

- Dialectics in Communication: Baxter & Montgomery

Even though Bakhtin's work was not related to communication sciences, two communication scholars Baxter and Montgomery were positively influenced by his approaches. Their main focus is the communication performance of friendships, non-marital relationships, marital relationships, and family relationships (Baxter & Montgomery, 1996, p. 4). Moreover, Baxter and Montgomery (1996) support the term of relational dialectics as "uniquely patterned and richly colored by the dialogic complexities of communicating in personal relationships" (p. 6).

o Contradictions/ Tensions

Contradictions refer to the interaction between united opposites. At this point, dialectical opposites are interdependent with one another. However, the combination between the opposites creates a relational system characterized by contingency, fluidity and change. Yet, according to a dialectical perspective, the contradictions were identified as the basic "drivers" of change. (Baxter & Montgomery, 1996, 1998). Baxter and Simon (1993) defined dialectical tensions as contradictory forces experienced by people in their relationships. Three pairs of dialectic tensions have been mentioned repeatedly, although with variations in terminology: Autonomy and connectedness (the tension between the simultaneous needs for independence and dependence in relationships); Predictability and novelty (the tension between the simultaneous needs for certainty (confidence) and uniqueness); Openness and closedness (the tension between the simultaneous needs to reveal information and strategically withhold some) (as cited by Kramer, 2004, p. 312).

o Strategies

Baxter and Montgomery (1996) presented six strategies, or as they call them "patterns," that people use to address the dialectic contradictions they experience in relationships: Spiraling inversion, segmentation, balance, integration, recalibration and reaffirmation. The first pattern consists a *spiraling* inversion to which pole of a contradiction is dominant at a certain point in time. *Segmentation* inversion doesn't happen in a certain time, but in topic and activity sphere. *Balance* helps compromise between dialectical poles. The pattern of *integration* gives the both sides of the opposing forces a chance to respond without compromising. Recalibration includes an alteration-expressed form of a contradiction where the opposing forces don't act as

oppositional anymore; rather polarities are encompassed in one another. Finally, reaffirmation involves an acceptance by the parties that contradictory polarities cannot be reconciled in any way (p. 62-66).

- *How dialectics has been applied in other fields*

Dialectical tensions have been applied mostly by communication scholars. However, scholars from different fields employ the dialectical framework in their research. Prentice and Kramer (2006) Braus (1995) used the dialectical tensions in classroom interactions. On the other hand, Chen, Drzewiecka, and Sias (2001) did a study on international students' friendships.

Dialectical tensions have been frequently used in family communication studies. Sabourin and Stamp used a dialectical method to study the communication behavior of 10 couples with a history of abuse and 10 non-abusive couples, while Pawlowski (1998) examined the tensions at the beginning, middle and present of the marital relationships.

Braithwaite and Baxter, studied the interaction between the nonresidential parent and his/her child who resides as part of a stepfamily household.

We found one study (Jameson, 2004) that used the dialectical tensions in the organizational communication context; and another one by Kramers (2004), who applied the dialectical frame for analyzing the tensions in a community theatre group. Additionally Britt (2005), employed the dialectical method in his research study to the community in a neighborhood homeowners' association.

Methods

Participants and Observations

Five of the participants were professors, while the sixth one was the director of communication in Ball State University's international office. All participants had a very rich experience in Intercultural Videoconferencing (IV). Data were gathered from these participants by conducting interviews. Participants in this research project were chosen with *snow-ball* technique (cite L&T and provide justification for why snowball technique is useful). Three of the professors were from BSU, one was from Indiana University Purdue University Indianapolis (IUPUI), and one was from Venezuela, but was currently involved in a PhD program at BSU. Additionally, in order to get the "flavor" of how IVs occurred, we observed two IVs that occurred at BSU's international office. One was with the University from Japan and the other was with two Universities from Thailand.

Data Analysis

We integrated the categories that we already derived from doing open coding. The process of integrating categories, where you can either create a new one or have a theme that would span many categories, is called axial coding (Lindlof and Taylor, 2002, p. 220). After analyzing the data gathered from interviews, four themes emerged, which reflected dialectical tensions that professors experienced in the IVs. The themes were: a) reducing vs. creating stereotypes, b) successful & unsuccessful interaction in IV depends on preparation, c) pros and cons facing "new world," and d) the constructive and non-constructive role of nonverbal communication.

Analysis

We are analyzing our data by using few of overall six strategies offered by Baxter and Montgomery. These strategies explain how to cope with dialectical tensions in a relationship. However, the notion of relationship used by Baxter and Montgomery does not have the same connotation in present research. This study is not dealing with dialectical tensions within an existing relationship, but rather one described by professors.

Quick review of Baxter and Montgomery's strategies

According to Baxter and Montgomery (1996), the strategy of a *spiraling inversion* describes a certain contradiction that is leading in a given time. *Balance* on the other hand, is a strategy where the contradictions of both sides are “cast in a zero-sum” relation. However, B & M claim that this balance is an unstable response that could be diluted at any time. The final strategy used in this paper is *reaffirmation*. This strategy, according to Baxter and Montgomery acknowledges the richness afforded by each contradiction, and tolerates tensions posed by their unity (p. 62-66).

After analyzing the data gathered from interviews, four contradictions emerged: a) *reducing vs. creating stereotypes*, b) *successful & unsuccessful interaction in IV depends on preparation*, c) *pros and cons facing “new world”*, and d) *the constructive and non-constructive role of nonverbals*.

Reducing Vs. Creating Stereotypes

The concept of stereotypes was mentioned by all six interviewees that we had. A few of them talked about the process of reducing the existing stereotypes during IV; while others acknowledged that this process (of doing an IV?) could easily create one. The following example offered by Jackie will clarify the mentioned contradiction.

One of the students from American class was going to get married, she was 19. And my students, they're getting married young too, around 22, 23. But for them it was shocking that a young American girl was thinking of getting married. You know, when you think of America and the entire usual stereotype about getting married around 28, 29. But Indiana doesn't reflect all American culture, people here are very conservative.

We used the strategy of *spiraling inversion* to illuminate and analyze the contradiction created by a particular side in a given moment during the IV process. An example described by Jackie, explains the process of reducing stereotypes during the IV. As a result, reducing the stereotypes was *leading contradiction* in this analysis. On the other hand, while Jackie was giving the example of reducing the stereotype, she actually helped create a new one by mentioning that ‘Indiana doesn't reflect all American culture, people here are very conservative.’ However, considering that Jackie was more focused on explaining the reducing part of the stereotype, we can support the mentioned claim about reducing stereotype being a?? leading contradiction.

Successful & Limited Interaction in IV

In describing the interactions among students participating in IVs, the majority of our participants mentioned both successful and limited interactions in. Beth tended to have very positive standpoint regarding the interaction in the IV, while Don had more critical opinion about the same thing.

Beth: Oh, its wonderful, it takes awful lot of work on part of the professors, it's very stressful at times, but its really worth it, and I think even though its only ten students here and ten students there it can change their lives, it opens up the world for them. I think it gives them the desire to travel, that they might not had have otherwise, they feel that they can go to Egypt or Nepal and there is someone there that they know by name, that they're friends with already, it makes them much more willing to do that kind of physical exchange.

On the other hand, as mentioned, Don is elucidating the IV interaction quite differently than Beth. Don's critical standpoint delivers our second contradiction.

Don: Somewhat limited, videoconferencing does something that is very well, saves hundred and thousands of dollars to try and travel all this students. But it is not an immersive experience. The students involved only see the side that the other students want to show, if I can make an analogy to a city, it is different when you see the nice postcard of a city that you would see, and the pictures that someone would take, where you see the trashcans and maybe you see a dog on the street, or maybe you see something else that you wouldn't see in a nice postcard. When you do a videoconference you see what they want you to see and nothing more. So, it is restricted.

These contradictions are analyzed with the strategy of *balance*. Therefore, we can argue that Beth is describing a positive balance between having to do a lot of work as a professor and considering that work as worth doing. She is relying on the final outcomes to make these positive claims about the interaction between students in the IV. Don on the other hand, describes that the interaction between students in the IV is *restricted*. He makes the analogy between the nice city postcard and the real city with all the package of good and bad things. Don's claim of not having this "immersive experience" is clearly explaining the un-balanced standpoint about the interaction of students in the IV.

Pros and Cons facing "new world"

Considering the fact that IV for the majority of students provides an opportunity to learn something about a different culture, we wanted to examine how students react toward this "new world." Jackie's way of describing how her students reacted toward the new world was very rich and detailed. The word "shocked" is used several times by Jackie to describe her students' reaction toward the differences that "new world" provided. Therefore, we can label the students' reaction as a tension that they were dealing with in the newly created friendship.

Jackie: Surprised, sometimes shocked. For example the Venezuelans are affectionate people, so, for Americans was interesting to see when my students hugged me and kissed me, putting head on my shoulder, or boys and girls were sitting next to each other and they are just friends, nothing sexual. For the Nepalese that was really shocking. Another thing was, I think for American students the matchmaking in Nepal was a shock, you know, the fact that you are grown up in the culture where the parents choose your husband and wife, I mean it's not a big deal, love comes after marriage, whereas in our culture we do not have arranged marriages, and in USA certainly not. The religious part was interesting, learning about the Nepalese, you know the fact that Hinduism is a polytheistic religion is very surprising for USA.

Beth gave considerably different perspective about pros and cons of facing the "new world." She concentrated more on explaining how the notion of time is crucial in describing the students' reaction toward the new world. According to her, the students are "little shy at first" although

after a while, everybody starts feeling more comfortable and the process of IV becomes routine for them.

Beth: Well, they're always little shy at first, because they don't know these people and especially in the very beginning of the course when they just learning how to use the technology is very strange for them to have someone on the screen rather than literally face-to-face, so it takes a little while to feel comfortable with the medium. But once they get over that and feel comfortable and trust the people that they're communicating with, than it becomes pretty routine for them.

The Jackie's explanation suggested that there are lots of things from the new world that students are coping with. The amount of things that they are coping with can be treated as disadvantage of the IV. The dialectical tension related with pros and cons of the "new world" was analyzed by using both the strategy of *reaffirmation* and *balance*. This mix of two strategies is used due interviewee's justification of having lots of issues related to the "new world." We argue that this imperfection is prevailed by both sides' toleration and balance between pros and cons of the IV process.

The constructive and the Unconstructive Role of Nonverbal:

Most of our interviewees mentioned the function of nonverbal communication in the IV interactions. They often described how nonverbals enriched the IV process. However, from analyzing our data, we understood that our participants would often warn their students about the impact that non-desirable nonverbals might have.

Liz: Well, they are very important when audio problems happened, you know, that's when you have to be very careful about your non-verbal communication, because we use what, a thumb and two fingers together like this, and I think it means something "up yours," or "your mom sleeps with sailors," in Brazil.

On the other hand, Jackie explains how her students felt uncomfortable when the Nepali students looked her students in the eyes. As a result, we have constructive and unconstructive role of nonverbals in the IV process.

Jackie: For example (showing the sign of OK,) in Venezuela this means you are gay, whereas in America this is OK. So I told to my students, "use your hands but try to find out first what that means." Oh, and one more thing, even though through videoconferencing is a bit difficult, but, for my students what was difficult was that in the beginning the Nepali students were looking at them in the eyes.

The strategy of *reaffirmation* seems to be the strategy used to address the contradiction between the constructive and non-constructive role of nonverbals in IV. Liz claims that nonverbals were "important when audio problems occurred." Also, Jackie's illustration about the contradiction created when Nepali students looked her students in the eyes, gives a very rich example of non-constructive role of nonverbals. From this analysis we can argue that the dialectical tension associated with nonverbals existed in the IV process. Moreover, this contradiction is very complex and very hard to reduce. However, the professor's additional explanation about the importance of nonverbals in helping the toleration in IV processes.

Discussion/ Limitations and Future directions

The results of this study present four relational contradictions that were experienced by professors using IV technology to hold a classroom dialogue with students in different cultures.

Additionally, we revealed some of the strategies professors used to address these dialectical tensions. Having professors as research participants helps the credibility of this study. They were professionals in their fields of inquiry, therefore their opinions were very affluent and complete. According to Wang, considering the diversity of the global Internet society, cultural sensitivity and flexibility are essential to collaborative virtual classroom success (2001, p. 519). Some of contradictions found in this study may possibly be a result of one's sides lack of cultural sensitivity and flexibility. This leads us to our first contradiction related with stereotypes that the IV participants deal with. Additionally, other relational contradictions found in this study can be partially considered as a product of technological difficulties that those engaging in IV face. Wang (2001) claims that "as opposed to face-to-face setting where communicators can choose their focus of attention (or inattention), in the video-conferencing environment, the camera setting dictates viewers' attention (p. 518).

Nonetheless, the connection technological difficulties and relational contradictions is not the focus of this study. We suggest that there is a need for future studies to focus more on the relation between technological difficulties of the IV and relational contradictions (tensions) of the same IV process.

The main limitation of the present study is the lack of students' perspective on IV process. We also suggest that future studies about dialectical tensions and IV, should take into account the students' perspective in order to have wider outlook on IV process. This additionally could offer richer results than the present study does.

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Gender, Attachment, Competitive Anxiety and Self-Confidence among Competitive Swimmers

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ABSTRACT

Attachment has been associated with the way individuals adjust themselves in various social, emotional and behavioral contexts. Attachment and sports performance remains one of the most unexplored topics in sport psychology. Thus, the aim of this study was to examine possible relationships between attachment styles, competitive anxiety, self-confidence and performance among competitive swimmers aged 17-20. The participants were 44 swimmers from all over Sweden (24 elite and 20 sub-elite). It was hypothesized that elite swimmers differ significantly from sub-elite swimmers in their attachment, competitive anxiety and self-confidence scores. The hypotheses were partially supported by the findings. The study found one significant result, which stated that insecure anxious attachment style combined with young age predicted lower performance results among swimmers. Interestingly this style was found to be prevalent among sub-elite swimmers. The findings should be treated in a very delicate and careful way and ethical considerations should be considered.

Keywords: attachment, competitive anxiety, self-confidence, swimming, performance

Introduction

Attachment theory studies the nature of early experiences during childhood and the later impact of these experiences on personality and general functioning of the individual. The key assumption of this theory is that secure individuals grow up self-confident, are trusty towards others and use adaptive strategies to deal with stress, whereas insecure individuals tend to experience feelings of mistrust, low self-confidence and use maladaptive strategies while dealing with stress. Bowlby in his theory will refer to two main types of attachment: secure and insecure. Ainsworth and Bell (1970), will conduct further investigations on Bowlby theory and conclude that insecure attachment patterns could be explained based on two underlying mechanisms: anxiety and avoidance. Hereby, insecure attachment, according to them, stands either for insecure anxious or insecure avoidant.

As can be noted, different types of attachment react differently to transitory distressful situations (Bowlby, 1973). Sports in itself represents an environment which continuously places demands on athletes and faces them with different stressors such as fear of failure, injury, pain, self-doubts about talent and team selection, competitive pressure, lack of self-confidence, anxiety, coach stress, financial issues (e.g. Dale, 2000; Gould et al., 1993; Holt & Hogg, 2002; Nicholls & Polman, 2007).

If the athlete won't be able to cope effectively with these stressors then he/she will possibly face a number of negative consequences where motivation, commitment and satisfaction will be affected and his or her performance will suffer (Nicholls & Polman, 2007). This pressure to either

adapt or change lead people to cognitively appraise their resources, coping skills and the ability to respond to the environmental demands (Lazarus & Folkman, 1984). Most of the times, this process is mediated by type of attachment and is associated with high levels of anxiety. On the other hand, self-confidence is thought to be one of the most common sources of stress and anxiety (Weinberg and Gould, 2011).

With this knowledge background it should be possible to deduce that attachment can in some way affect different domains of functioning including performance. Thus, the focus of the present study was to investigate the relationship between attachment, competitive anxiety and self-confidence among competitive swimmers aged 17-20.

Research Methodology

A cross-sectional design using quantitative and qualitative methods for data collection was applied in order to investigate the questions of interest. All the instruments involved in the study produced quantitative data.

Operationalization of the Study's Main Variables

Performance outcomes. In the present study participants were carefully chosen in a way that they could share common characteristics such as age and sport. At the same time they were chosen so they could differ significantly in terms of training hours per week, career goals and objective performance results.

They were categorized into two big groups; high-competitive elite athletes and sub-elite athletes focusing only on objective performance results. Annual points of each swimmer, collected during the previous year 2011- 2012, in different national and international events, according to Swedish Swimming Federation Database, were taken in consideration. In the database the swimmers were ranked from the first best one, who scored 961 points to the last one who scored 515 points. Each list had in total the results of 240 swimmers.

The research group defined as high-competitive elite- athletes those swimmers, who were ranked from number 1 to 40 in the Swedish Swimming Ranking Database list and scored from 961 to 715 points. On the other hand, sub-elite swimmers were defined as those in the lowest part of the ranking list, starting from number 200 to 240, who scored from 552 to 515 points.

Attachment outcomes. Research on attachment has categorized attachment measures in dimensional (continuous) versus categorical and self-reporting versus coding of observed data (Ravitz et al., 2005). Categorical measures usually strictly assign individuals in one of the four categories of attachment, whereas dimensional models measure the degree to which various dimensions of attachment styles (security, anxiety and avoidance), are mostly presented in one person.

It is believed that self-reporting measures are based on currently conscious attitudes toward relationships with important others and therefore they cannot detect defense mechanisms of distorted responses. On the other hand, coding of observed data measures, such as interviews or projective and narrative tests, tend to reduce the response biases through activating thoughts and feeling in relation to early attachment patterns.

Therefore, to have a clear view of the swimmers attachment style, in the current study, two

different attachment instruments were used: the ASQ and the SBST. ASQ represents a self-reporting instrument resulting in continuous attachment data and the SBST represents a projective instrument based on narrative stories, and results in both continuous and categorical data.

Competitive Anxiety outcomes. Competitive anxiety was measured by CSAI-2, which is known for assessing intensity and direction of cognitive anxiety, somatic anxiety and self-confidence.

Participants

Both, Swedish Swimming Federation and the Swedish Aquatic Research, approved to be part of the study and provided two performance ranking lists, according to gender, which contained the contact addresses of 240 competitive swimmers, aged 17- 20, in Sweden, and their respective performance results during the previous year 2011-2012. In order to compare elite and sub-elite swimmers, from the two lists, only the forty best swimmers ranked from number 1 to 40 (40 boys and 40 girls) and the swimmers ranked from number 200 to 240, were included in the study. In total, 44 swimmers from all over Sweden (22 boys and 22 girls), aged 17-20 ($M=19$ years old; $SD=1.3$), agreed to participate in the study. 24 elite swimmers (performance scores ranking from 961 to 715) (8 girls and 16 boys), training on an average 20 hours per week ($M=20.4$, $SD=3.6$) and 20 sub-elite swimmers (14 girls and 6 boys) (performance scores ranking from 552 to 515), training on average 15 hours per week ($M=14.6$, $SD=4.5$).

Measures

All the questionnaires used were administered in Swedish and have been shown to have acceptable reliability and validity. The first part of the online survey consisted of general questions concerning the athletes' training hours per week, future career goals, and support from important others. The second part addressed attachment style through two instruments: The Secure Based Script (SBST: Psouni&Apetroaia, in press) which represents a narrative based assessment and the Attachment Style Questionnaire (Feeney et al., 1994) a self-reported measure of attachment in relation to personal thoughts and feelings. The fourth part was an assessment of performance anxiety intensity and direction and self-confidence through the Competitive State Anxiety Inventory-2 (Martens, Burton, Vealey, Bump, & Smith, 1990).

Results

Descriptive statistics

Both elite and sub-elite reported their parents to be most important figures in supporting them in sports performance, with coach and friends following after. In terms of attachment scores, there were significant differences between the elite and sub-elite swimmer groups only in the anxiety dimension, with a large effect size of $\mu^2 = .10$ (mean difference = .19, 95% CI: -.64 to .24), where the elite group scored higher than the sub-elite group ($t(40) = -2.04$, $p=.05$, two-tailed) with a very small significant difference in the means ($\mu^2=.02$; mean difference = -.47, 95% CI: -.93 to .006).

The results showed also a strong significant negative relationship between confidence/security and avoidance attachment dimensions ($p < .01$), where high levels of attachment confidence

were associated with low levels of attachment avoidance. There was also a negative significant relationship between confidence and anxiety attachment dimension ($p < .01$). Avoidance and anxiety dimensions of attachment in the ASQ ($p < .01$), were positively and significantly correlated to each other. Whereas, self-confidence was negatively significantly related to competitive anxiety ($p < .01$).

Correlational statistics

Self-confidence was significantly positively related to attachment confidence (ASQ) ($p < .01$) and negatively related to attachment anxiety and avoidance (ASQ) ($p < .05$) and somatic and cognitive anxiety. The relationship between performance and self-confidence showed to be negative in the elite group and positive in the sub-elite group, but the results were not statistically significant. Competitive anxiety was significantly negatively correlated with confidence/secure dimension of attachment ($p < .01$) and positively correlated with insecure attachment anxiety and avoidance dimension ($p < .05$). The relationships were considered stronger in the case of the sub-elite group ($p < .05$). Performance results were negatively correlated with competitive anxiety, attachment avoidance and anxiety dimension ($p < .05$) and positively correlated with self-confidence and secure attachment (confidence), but no significant result was achieved.

Multiple Regression data

Once the model was checked, it was established that only attachment anxiety dimension showed a significant relationship with performance ($r = .33$), which confirmed our correlation statistics. More specifically, age and sex were entered at the Step 1, explaining 15% of variance in swimmers overall performance results. After entering all the remaining controlling variables plus anxious attachment dimension in Step 2, the analysis again excluded all the variables, maintaining only sex, age and anxious attachment as predictive variables. The total variance explained by the model 2 was 23.2%, $F(3, 38) = 3.83$, $p < .05$. Therefore, insecure attachment anxiety dimension explained an additional of 8.5% of the variance in performance, after controlling for age and sex variables, $R^2 \text{ change} = .08$, $F \text{ change}(1, 38) = 4.194$, $p < .05$. In the final model anxious attachment dimension highly contributed to make the difference with beta values $= 1.63$, $p < .05$, (Table 7). To examine the impact of attachment and self-confidence onto competitive anxiety another stepwise regression analysis was conducted. Participants sex and age were entered in a first block, followed by self-confidence, attachment confidence and attachment anxiety and competitive anxiety. The model maintained only self-confidence as a significant predictor of competitive anxiety capturing 54% of the variation of competitive anxiety in swimmers $F(1, 40) = 46.65$, $p < .01$ with beta values (beta $= -.734$ $p < .01$).

Discussion and Implications

Previous to this study, the relationship between attachment and swimming performance had not been addressed. Therefore, the aim of this study was to examine associations between type of attachment, competitive anxiety, self-confidence and performance. It was hypothesized that elite athletes differ significantly from sub-elite athletes in their trends of attachment, competitive anxiety and self-confidence scores. Overall, results partially supported our hypotheses. Anxious attachment style, combined with young age, and gender was found to be strongly related to lower

performance results. Also, low levels of self-confidence predicted high levels of perceived competitive anxiety among swimmers.

More specifically, the results indicated that swimmers with high levels of self-confidence experienced less competitive anxiety than swimmers with low levels of self-confidence, but this relation did not affect significantly their performance results. As predicted, self-confidence showed a strong negative relationship to competitive anxiety and a positive relationship to performance (although not statistically significant). The results between self-confidence and competitive anxiety were consistent with relevant literature on this topic, which stated that high levels of self-confidence were usually related to low levels of experienced anxiety (Weinberg & Gould, 2011; Lundqvist et al., 2010; Jones et al., 1993). Unfortunately, the present findings couldn't demonstrate a significant relation between competitive anxiety, self-confidence and performance results. The weak associations between self-confidence, competitive anxiety and performance may be due to the small sample size of the group of interest involved in the study. Other research strongly supported the significant positive effect of self-confidence and negative effect of competitive anxiety into performance (Weinberg & Gould 2011, Jones & Hardy, 1990; Valey, 2005). Securely attached swimmers were more self-confident, experienced less competitive anxiety and had better performance results than insecurely attached swimmers. This finding was consistent with relevant literature in the field which studied the effect of secure attachment in different domains especially with regard to academic and sports performance results and self-confidence (Ein-Dor et al., 2012; Fass & Tubman, 2002; Moss & St-Laurent, 2001). On the contrary, anxious and avoidant attached swimmers displayed low levels of self-confidence, high levels of competitive anxiety and poor performance results. Surprisingly, this finding was expected for the anxious type, but not for the avoidant type. Research in this area has indicated that individuals with avoidant attachment style usually score higher on self-esteem (Bartholomew & Horowitz, 1991; Brennan & Morris, 1997) and performed better in individual sports such as tennis (Ein-Dor et al., 2012). Somehow the present result made sense, since both of the categories fell into attachment insecurity style and attachment insecurity is usually related to negative results on dimensions that are detrimental to performance (Ein-Dor et al., 2012). Again, the avoidant attachment category scored differently than expected in relation to competitive anxiety. Avoidant swimmers experienced high levels of competitive anxiety. Updated research emphasized that children with avoidant attachment histories did not develop so much anxiety symptoms compared to other categories of attachment, possibly due to the high vigilance sense they had developed during their early childhood. Therefore in distressful situations such as competition events, individuals with avoidant attachment styles were expected to experience less anxiety than other categories (Cassidy & Shaver, 2008).

Elite swimmers showed to be more securely attached than sub-elite swimmers, who scored higher in both insecure dimensions of attachment. The difference between the two groups was significant only in the case of anxious attachment type, where the sub-elite group dominated this dimension. Given that securely attached individuals accessed more adaptive strategies for dealing with stress than insecurely attached individuals, sub-elite group might be inclined to approach the insecure dimension (Mikulincer & Shaver, 2007). Consistent with the previous reasoning, it was expected that elite swimmers experienced less competitive anxiety than sub-

elite swimmers and perceived anxiety symptoms as facilitative rather than debilitating to their performance. Surprisingly, the two groups did not differ significantly in their competitive anxiety intensity and direction scores, even though there were found different associations between attachment and performance anxiety in both groups. This finding was partly in line with updated research within the field supporting actual difference between elite and sub-elite athletes in the way they experienced and perceived anxiety symptoms either as facilitative or as debilitating to their performance. According to Lundqvist et al. (2010), sub-elite athletes tended to rate higher percentages of anxiety items as debilitating to their performance in contrast to elite athletes.

To conclude, the findings suggested that insecurity attachment (the anxious type) combined with young age and gender predicted lower performance results. This was a very strong assumption, especially when considered the high interest of coaches and clubs to identify talents and factors that affect performance. Future research, which may wish to reconsider this approach, should take into consideration also different sports, larger groups and check further the impact of secure and avoidant attachment styles into performance. As previously mentioned, the study conducted by Ein-Dor (2012) found that avoidant type was beneficial to performance, a significant result which was not supported in the current study.

However, if this study findings find future support, ethical issues may arise. This could be due to claiming that insecure anxious attachment type lead to poor performance results, which may lead to different consequences for the athlete's career depending on how the coaches and clubs use this information. Reflections should arise in regard if coaches and clubs should be in knowledge of athlete types' of attachment and who will be in control of the use they make of this information. It could happen that clubs may start to choose athletes based on the assumption that insecure anxious attached athletes can hardly be elite athletes. Therefore, categorizing them could have tremendous negative consequences on the young athletes' career.

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The correlation between Mathematics and Music - practice with the students of the Pedagogical Faculty in Sarajevo

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ABSTRACT

In contemporary times, the principle of interdisciplinarity has been applied more and more, and based on that the educational system allows a certain subject not to be confined any longer within the limits set by its name and it also allows the cross-curricular connectedness.

Led by that, the authors came up with the idea to examine the possibilities of the application of this principle within the courses of Mathematics and Music. This paper examines the relationship of correlation - integration - co-ordination, or linking - conjoining - harmonizing. The sample consists of the students at the fourth and fifth year of the Pedagogical Faculty in Sarajevo. The research topic is the correlation between Mathematics and Music. The research problem is the possibility to successfully realize a class in which mathematical and musical activities correlate. The aim of the research is to come up with some guidelines that would lead to a more successful application of the aforementioned correlation in practice and that would partly offer a solution to the identified problem. The research methods are the analysis of the pedagogical theory, the descriptive method and the method of case study.

The results that were obtained are important for the practice and their implementation contributes to the development of competencies and creativity of students – as future teachers. The advantage of the students of the Pedagogical Faculty is precisely the ability to integrate different teaching contents for the purpose of an integrated approach to education. The conclusion is that we should work more on the possibilities of applying various forms of intercorrelation between subjects, to make the class content even more appropriate to the natural environment in which the child learns in a relaxed manner.

Key words: mathematics, music, intersubject correlation, teaching practice.

Theoretical Outline

Mathematics and music seem totally different at first glance. However, both mathematics and music encompass structures, patterns, relations and generators of beauty ideas and elegance. Those who practice the two share many common features: abstract thinking, creativity and intensive focus. Mathematics explains how tones are produced and which principles make harmonious units, while music is a very fertile soil to test mathematical principles. The correlation between mathematics and music was present even in the distant past. Ancient philosophers (Plato and Aristotle) placed music into quadrivium of mathematical skills, together with geometry, arithmetic and astronomy. The very beginning of the theory of music refer to Pythagora and his pupils. By studying the harmony of music they concluded that the very

essence of everything is – a number. Indian and Chinese theoreticians also connected mathematics with harmony and rhythm. Mathematics, music and language were considered as a part of one whole, for centuries. Later on, idea of separating mathematics and science on the one side, and art and language on the other side, has come to be.

Author Gardner (2005) points out that every man possesses nine (he began with seven) types of intelligence, whereas all people have at least three out of these nine very well developed. His work and theory demonstrated in a very convincing manner that music can help children study more, with pleasure, over the limits within which their music intelligence is confined. According to the author, musical culture intelligence means that children understand and produce melodies, rhythms, know how to sing, play instruments. Musical intelligence helps children read, do maths, stimulates creativity, imagination, learning foreign languages, memorising facts and ideas. By learning how to play an instrument, a child develops critical thinking.

Author Edwards (2009) in her book of Creative Art points out the correlation between physical/kinaesthetic and logical/mathematical intelligence and music. While children are learning music, they are also learning fractions, quotients, ratios, sequences and recurrence. They learn how to count to keep the rhythm, establish patterns and number of recurrences in one musical theme to understand the basic musical form. Through the analytical listening of some composition children learn to empower their body coordination, develop various capabilities and their muscles, sense for moving along the music, according to the metre or rhythm. Artist and craftsman use their hands to create masterpieces, while playing an instrument children improve hand and finger movements.

Author Hanaford (2007) in her book Smart Steps shows how much the child's ability for physical coordination and development of fine motorics is developing while the child is dancing to the rhythm or marching. According to author, movement is a necessary part of learning and thinking. Therefore, all the games where child sings, dances, marches or spontaneously moves actually develop speech, motoric and auditive skills.

It is interesting how children at this age can already show their talent for mathematics if they play keyboard.

Authors as Rocher (2001) discovered that children age 5, having previously had piano classes for eight months, are much better at solving mathematical tasks, draw geometry or copy patterns and thus develop special skills that help with complex mathematics later on.

In one-teacher classes it is very easy to implement integrated education since the teacher has comprehensive approach to all subjects, not only musical classes or mathematics. How the two are going to be integrated with other subjects or vice versa depends on many circumstances as teacher's creativity and ability, individual needs of students or class atmosphere in general.

This relationship between mathematics and music is being updated. A research is being done to increase cognitive development and acquiring skills, especially in mathematics. Royal Conservatory of Music started a program „Learning Through Art“. For example, many experts were engaged to use composing to increase cognitive abilities with children since composing resembles solving mathematical problems – one should adjust text and rhythm, as in this case, rhythm is nothing but mathematical equation where combinatory skills are used.

Each child and its education is very important. Therefore, it is very important to deal with the results and possibilities of improving those results as to leave each child a possibility of progress.

Working on it's motivation, which is sometimes triggered by something unexpected, we will probably motivate a child to put more effort into its work and accomplishing better results. It is important to work with them at early age because they go through specific stages of development and employing their abilities at proper period is very important.

At pedagogical universities students learn many facts. Students – teachers-to-be – are well educated on every field related to facts they are about to present to their students. However, they do not learn about correlations between these subjects. That is left up to their creativity and own will to tackle it. Exactly these inspired the authors of this essay to do a research that is about to be presented in details. Due to practical reasons authors decided to do workshop with students – future teachers.

Research Methodology

Research topic:

The possibility of using interdisciplinarity as a part of the two subjects: mathematics and music.

Research subject:

The subject of the research is the correlation between two subjects: mathematics and music.

Research problem:

The problem of the research is the possibility of successfully realising a lesson in which mathematic and music contents correlate.

Research purpose:

The purpose of this research is to reach certain guidelines, which would in practice lead to a more successful implementation of the aforesaid correlation, and which would partly resolve the perceived problem.

Research hypotheses:

H₀ – It is possible to reach a very good correlation between mathematics and music.

H₁ – Students will not be able to combine similar knowledge from mathematics and music.

H₂ – The students will not to recognise the possibilities for creative solutions.

H₃ – The students will be pleasantly surprised by the possibilities they will see at the workshop.

H₄ – The students will change their opinion about the possibilities of establishing correlation between mathematics and music.

H₅ – The students will see that one can enjoy a certain work, if it is well designed, from the beginning until its end, and that motivation for the work is in due

proportion with that enjoying.

Research methods:

List of the research methods:

- ~ Analysis of the pedagogical theory,
- ~ Descriptive method, and
- ~ Case study method.

Research techniques:

List of the research techniques:

- ~ Survey sampling,
- ~ Testing,
- ~ Arranging the data.

Research instruments:

List of the research instruments:

- ~ Questionnaire 1
- ~ Initial Test
- ~ Final Test
- ~ Questionnaire 2

Description of instruments:

Questionnaire 1 was used in the beginning of the workshop. It was used to determine facts related to students' opinions about the possibilities of establishing a correlation between various subjects in primary school class teaching.

The initial test was used in order to assess the current level of students' basic knowledge in the area of music and elementary mathematics.

The final test was quite similar to the initial test, whose purpose was to be able to determine whether the results were higher after this workshop.

The Questionnaire 2 was used in the end of the workshop in order to reach a feedback from the students about the effects of the very workshop.

Research sample:

The sample consisted of 12 students from the fourth year of the Primary School Class Teaching Department at the Pedagogical Faculty in Sarajevo.

Research Description and Results

In the beginning, we presented the work plan to the students and shortly explained to them the purpose of this workshop. There was no need for introducing ourselves to each other as those were our students we have been cooperating with for four years already.



After that, we gave a questionnaire to the students and explained to them the way in which it should be filled. With analysis of the answers, we learned that all the students considered that it was very important to establish good-quality correlations between the subjects. From all the possible correlations, they focused on following: music – art, music – science and social studies were most frequently used in teaching, while the one which was used the least was music – mathematics. It was opinion of some of the students that it was impossible to establish the correlation between mathematics and music. The ones with opposite opinion deemed that the correlation was possible through the musical meter, rhythm, counting songs, numbers, songs, movement, musical games and similar. As for the correlation between mathematics and other subjects, the students' opinions were diverse. Their opinions referred to subjects: music, Bosnian language, art, science and social studies, physical and health education. They gave similar answers for music as well.

After the survey, the students solved the initial test. A pleasant music was played in the background during the test, in order to reach a more relaxed atmosphere. The test consisted of five tasks which associated elementary mathematic and musical knowledge.





The results were poor, what was actually expected, because during their education, these students did not have an opportunity to practically learn about the possibilities of making correlations between the contents of certain subjects, which posed a big problem for them here as well. They viewed these tasks categorically as either mathematic or music, so that they wrote the sum of two notes as a fraction, or they wrote for $\frac{3}{4}$ fraction that it was three quarter note (musical measure). With further analysis, we discovered that the students did not know the symbols for rest (whole rest and half rest) which they did not face often in their practice. In addition, we determined that e.g. $\frac{3}{4}$ is only a fraction in mathematics, while it is just a musical measure, and these two notions are not entirely different, but they could not explain how and in what ways. In the following task, they mixed the facts from mathematics and music in their attempt to apply the correlation which had been mentioned all that time.

e.g. $\text{♪} + \text{♪} = 1$.

After the survey, the students were divided in three groups each having four students. Then the students watched a video in which they saw numbers from 1 to 10, followed by a French song whose text actually consisted of those numbers, from 1 to 10. The students immediately noticed a correlation between mathematics, music and French language. Later on, while the students were still under the influence of the said video, we distributed a set of applications to each group, which helped them to attentively notice the link between the musical rhythm, notes, rest, fractions, and imagery of fractions. At first, we talked about those associations, repeated elements of musical knowledge and a possible connection with some parts of mathematic knowledge. We then mentioned a possibility of correlating between these two subjects. Afterwards, we had a first musical rhythmical game "Sit and clap dance".



While sitting in a circle, and listening the characteristic musical beat in the background, using our body instruments, we tried to think out a certain rhythmical form for numbers from one to three. The students were surprised, amazed and they were active. With lots of laughter, they thought out a rhythmical combination for a range of numbers. In the very beginning, they followed the designated rhythmical form, and after that they conceived new rhythmical combinations. The students were visibly surprised by the possibilities of establishing a correlation between mathematics and music. In their opinion, they learned a lot.

The previous game served to distract the students' attention from the first applications they were given, and which had striking colours. The students now received a bit smaller applications, having similar content as the first ones, and whose colours were not diverse, but they were white. A new task for them was to implement the same idea, being employed on the applications used by the students, on papers with drawn rectangles. Namely, their task was to make their own applications with usage of an analogy principle.



We then concluded that the students did not comprehend the essence of the task, what was probably caused by not facing similar tasks during their education. The students unnecessarily laded the drawing with additional images, ornaments. That would certainly distract the students' attention from the essence and they would probably not be able to reach the imagined goal. A lack of logical mathematic thinking was visible. The spatial relations were incorrectly interpreted by some of the students.

Following this, the students were given a musical task. They were supposed to extract only the rhythm from a melody sample, by sticking little applications they had available (they were prepared in advance and distributed to the students). It was interesting to see how they literally copied the note letters, without taking into account that melody and rhythm cannot be written in the same manner.

Their next task was to recognise and write a proper musical measure, through analysing a melody sample. The students reached their solutions by counting the notes in the first tact.



Later on, the students had an opportunity to see a short video in which children learned the multiplication table for a certain number through a song and usage of the instruments of their bodies, in a rhythmical and characteristic manner. The students were visibly delighted and surprised with the contents of this video.

Their task was to use the same idea for some other mathematical contents. They could use rhythmical instruments of the Orff Instrumentarium, their voice and body instruments: palms, twiddling thumbs, patting their knees and similar. The first group associated numbers up to 10, with specially emphasising even numbers – thesis (emphasised time), uneven numbers – arsis (non-emphasised time). The second group associated the multiplication table for number one (with numbers up to 5) with the appropriate number of rhythmical beats (multiplication results). The third group interpreted a range of numbers up to five. On that occasion, they managed to evoke the musical meter and rhythm.



We started testing the gained knowledge afterwards. This test was similar to the first one, so that we could compare the results and ascertain a possible progress in the knowledge. The improvement of the results was obvious. The students showed a great progress in every task. Their answers were much more precise and correct as workshop progressed.

Afterwards, we evaluated what was done. We reached a conclusion that everybody liked the workshop and they would be willing and glad to take part in another workshop again. The students stressed that they liked everything at the workshop, especially the task in which they showed their creativity and the skill in associating a certain mathematical knowledge with the musical game. They praised the work organisation, selection of tasks and games. They also stated that this workshop changed their opinion and that they had so far deemed mathematics as the subject with the lowest possibility for showing creativity. Their opinion now was that it was possible to establish correlation between any subjects. They emphasised that they were no longer afraid of associating content from mathematics and music. They realised that music could have a valuable space in mathematics so that pupils would get to like this subject.



Then they clearly emphasised that they wanted such and similar workshops to be repeated and in correlation with other subjects. They all graded this workshop with number 5 (the highest grade) for being useful and successful.

The workshop was finished with a music game "Sit and clap dance" in which the students enjoyed.

Conclusion

It was quite a challenge for us to design and organise such a workshop, as we so far have not organised something similar in our faculty. It was also a challenge for us to motivate the students to be a part of something unknown and spend their free time for that. We have to conclude that our fears were not justified and that the students were really delighted with the offered. They enjoyed in the chosen segments of the work. However, we noticed that every time we brought new papers with new tasks, a glimpse of fear could be seen in their eyes.

We can conclude that all our hypothesis have been confirmed and after we talked to them, we concluded that the cause for their fear was uncertainty they felt when they were given unknown mathematic tasks. This is an indicator that we have to work a lot on eliminating various factors that prevent many from shining in their full brightness as teachers. Many of our students confine themselves by their own insecurities, however, we could see that we managed to eliminate a lot through a small workshop, what means that with a little bit of work we could reach the heights reserved for top teachers.

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Human Secret Potential: Analysis and Critical Understanding of Unconscious Intelligence

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ABSTRACT

Poole (1998) defines intelligence as an agent which adopts the circumstances of the present environment and its goal to learn from experiences. In this sense, unconscious intelligence could be defined as a capability of adaptation, learning, and storing information at the level of the unconscious mind for later use. The aim of this paper is to answer the question regarding unconscious intelligence: 'Is there a phenomenon that could be defined as unconscious intelligence?' To answer this question, the paper will research and investigate the historical basis of unconscious intelligence and will survey different approaches in the field of psychology. Furthermore, the paper will analyze the basics of unconscious mind and the working principals of conscious, as opposed to unconscious intelligence. In conclusion, the paper will provide an outline of the working principals of the unconscious intelligence, in order to clarify and understand the difference between conscious and unconscious intelligence.

Key words: unconscious mind, unconscious intelligence, intelligence, consciousness.

Introduction

According to the journal, History of Psychology, published by American Psychology Association, studies of mind and behaviour can be seen back in Ancient Greeks. That so, It's easy to understand that psychology science bear lots of different perspectives and different studies. William Wundt's first psychology laboratory defined him as the father of psychology and founder of experimental psychology approach. After this very big step of Wundt's, psychology science had been developed by studies of William James, Ivan Pavlov, Carl Jung, Adler, Freud and many others that their names would be mentioned for their contributions to psychology.

All of the names had studied in different areas. There are many important and fundamental subjects could be studied. There are tons of studies in social psychology, developmental psychology, experimental psychology, and cognitive psychology and etc. These all studies are somehow make emphasizes on human behaviours, emotions, developmental stages, social interaction ways, their intelligence, but not mind and its main dues.

The mind has always been a mystery to all. It's highly complex and hard to understand because it's intangible. And this intangibility fears many researchers to get involve with this subject. There are not much hints to follow to enlighten this very complex subject.

Beside the subject of mind, there is one another subject stayed in fog which is intelligence.

Of course, there are many philosophers and psychologists who are dealing with this subject but all attempts are somehow limited and mainly emphasized about defining and measuring it. There are so less studies and researches about the interaction of intelligence with other aspects of human brain or most importantly with mind.

In psychology, many researchers base their studies on observations and experiments. Although, observation and experiment are great ways to explain many subjects in psychology, there is a challenge to use these scientific approaches to explain intangible subjects such as mind and intelligence. On a research including these subjects, it's almost impossible for researcher to control them. And psychological experiments and researches mostly require controlling and manipulations.

In dictionaries, mind is explained as the part of a person that thinks, reasons, feels, and remembers. So from those definitions, it's possible to claim that mind is the centre of all psychological processes that makes an individual a human kind. Without mind, there is no thinking, there is no reasoning, decision making, feeling, judging or any other psychical feature. What would happen if we didn't have our mind? Most probably, whole humanity and its feature would be fading and humans would be acting without any thinking but instincts, which mean humans, would be equal to animals.

In his research, Thompson (2006) stated that minds are a product of billions of years of evolution. In the same paper, he claims that it's really essential to study the background and history of mind to understand what minds are and that we got here by means of gradual steps in an evolutionary process.

Furthermore, Thompson divides the evolution of mind into four stages, Stage One: The Pre-Mental, Stage Two: Mental Processes, Stage Three: Reflective Consciousness of Mind, Stage Four: Selfhood.

With the same sense that Thompson had, it's really important to examine the history of mind to understand upcoming developments in terms of unconscious mind. There were lots of different philosophers who studied about mind such as Plato, Aristotle, Descartes and etc. Among all of them Rene Descartes had the very beginning of explanations of the mind. He even connected his existence in this world with his existing thoughts and feelings. 'I think therefore I am' quote would be a proof of his inspiration about the studies in theory of mind.

Blutner (1998), who studied about philosophy of mind, mind and body, and Cartesian Dualism, noted that Descartes claimed minds and brains are substances of different kind. On another article published on a webpage, called The Mind from Descartes to Hegel, Descartes was aware of his consciousness and he believed that there is something else greater than his consciousness.

Author of the article noted that Descartes still saw consciousness as some kind of endowment given to human beings, while the human body, and the rest of the universe was governed by mechanical laws. This was in fact another problematic dualism: human beings endowed with thought, and mechanical Nature. Also this problem led Descartes to Cartesian Dualism.

Just like Descartes, Locke is also mentioning about Cartesian Dualism and he had studied about it. On the paper of Bennett(Cambridge University Press, 1994), it's stated that Locke also accepts Descartes's view that minds must be transparent to themselves, for example in his polemic against innately possessed ideas and knowledge, where he says that we aren't aware of any such possessions and couldn't have them without being aware of them: 'To imprint anything on the mind without the mind's perceiving it seems to me hardly intelligible'. Also, Bennett (1994) noted that he does not use this to define the realm of the mental, and it is not clear that he defines it at all. If he does, it is by saying that the idea of 'spirit'—which is one of his words for 'thing that has mentalistic properties'—is 'the idea of thinking, and moving a body.

Considering Descartes's and Locke's contributions to understanding of mind, it could be said that his thought led many others to study deeply on the subjects of mind, consciousness and unconsciousness.

After these contributions of philosophers thoughts about the mind, many scientists from different branches started showing interest of studying human intelligence, behaviour, and emotions.

And this issue caused the existence of different approaches in psychology with relations to different psychology schools. As it's mentioned before, William Wundt was one of the first and following him, James, Maslow, Freud, Jung, Piaget led different approaches in psychology.

One of the best known attempts to define mind was emerged by Sigmund Freud. Just like Descartes, he also faced difficult challenges during his explores about mind.

There were many others who argued his approach and his definitions, hypothesis, and theories. Especially his connection with Josef Breuer in France opened his mind to different questions of mind. And those questions were the first attempts to explain human mind in terms of psychology.

In relation to all, in this paper, different notions will be studied such as; definition of unconscious mind, theories of unconscious mind, Freudian approach to unconscious mind, intelligence, theories of intelligence, learning, memory, and intelligence, and relations between unconscious mind and intelligence. With all these studies, there also will be an attempt to criticize and analyse both notion's relations with the aim to answer a great questions which are, is there unconscious intelligence? And is there a way to control unconscious intelligence?

Definition of Unconscious Mind

In this modern time, whoever we ask about unconscious mind, people would say about it. Its most commonly heard thing but for sure there are some informational gaps in societies. On a magazine published in Turkey (2007), there is a given example to crystalize the perception of unconscious mind, and a specialist about unconscious mind in America says that 'Think of ship. All the crew of this ship is unconscious mind. They do all the works. And consciousness is the captain of the ship. When captain gives an order with his emotions, and says 'Don't do that', all the crew follow the order. Because the one who is on charge is the captain.' On this given example, it's a must to emphasize on due sharing. The ship is the mind, the captain is consciousness, and the crew is unconscious mind.

On another published article, Bargh and Morsella (2008) note that the unconscious mind is still viewed by many psychological scientists as the shadow of a "real" conscious mind, though there now exists substantial evidence that the unconscious is not identifiably less flexible, complex, controlling, deliberative, or action-oriented than is its counterpart. Authors, here on the article, have emphasized about fundamental features of unconscious mind with cognitive proofs.

Koch (2011), who published an article with the subject, said that unconscious mind is a sector of the mind that harbours thoughts and memories actively removed from conscious mind.

This view shows the fundamental feature of unconscious mind which is to store and record all the life of individuals with feelings, thoughts, memories, and personal experiences.

As well as Freud, there are many other psychologists who have their studies and theories about unconscious mind. After Freud, one of the best known psychologists, who have spent his entire life to explain dreams in terms of unconscious mind, Carl Jung, Ekstrom(2004), pointed out

Jung's perspective about unconscious mind, and he notes that 'A desire to reconcile religion and science was perhaps the strongest impetus for Jung's explorations of the unconscious.' And he continues, 'this desire had a personal angle, in that Jung wished to find ways of restoring a faith his father, a protestant preacher, felt he had lost.'

In his late memories, *Memories, Dreams, Reflections* (1962), Jung discusses his concern about the interface between religion and science by comparing the term 'the unconscious' with ideas of powers and gods which anthropologists had discovered to have been with us for a long time.'

We know that something unknown, alien, does come our way, just as we know that we do not ourselves make a dream or an inspiration, but that it somehow arises of its own accord. What does happen to us in this manner can be said to emanate from man, from a daimon, a god, or the unconscious. The first three terms have the great merit of including and evoking the emotional quality of numinosity, whereas the latter—the unconscious—is banal and therefore closer to reality. This latter concept includes the empirical realm – that is, the commonplace reality we know so well. (Jung 1962, p. 336)

With the quote of Jung, it's easier to understand his approach than trying to understand it with somebody else's words. Yet again, to simplify this, it could be claimed that Jung concluded unconscious mind as if it's just the sources of dreams, but nothing else. However Jung brought up new approaches to unconscious mind, he explained his aspect with similar way like Freud, with divisions of personal and collective unconscious minds.

A blogger, Cloosterman who is also studying about mind structures, had a different view about unconscious mind and she claims that unconscious mind is a great source for night dreams, and automatic thoughts (those that appear without apparent cause). She continues, it can be seen as the repository of memories that have been forgotten but that may nevertheless be accessible to consciousness at some later time.

With respect to all approaches to defining unconscious mind, it could be claimed that unconscious mind is storage with a huge gigabytes. All the feelings, thought, personal experiences, opinions which are not hold on conscious mind go to that storage.

And obviously, this storage sometimes can call back all that informations when it's needed or not needed. There are some rules that unconscious mind follows by its own aspects.

Within this part, it's been tried to also make an understand with the historical aspect of unconscious mind. It's known as Freud is the first psychologist made an impact of advertising of unconscious mind. But there were some others who tried to define the terms such as mind, consciousness, unconscious mind and etc.

Different Views on Unconscious Mind

As it was mentioned on definition of unconscious mind part, beside Freud, Jung, William James, Alfred Adler, and Lacan had also worked on the matter of unconscious mind. With these all psychology scientist, it has been tried to enlighten the main aspects of this intangible matter in psychology. So, in this part, it's going to be covered all that different ideas and views.

Most of the time, Jung and Adler and James had different opinions about Freudian unconscious mind theory. They all had different inspirations. Sometimes, they have been influenced within each other.

On a blog, a group of researchers had published an article about how they have been affected by each other and how they differ from each other. According to Goodwin (2008), Freud, Adler, Jung, and William James were the creators of modern psychology and new approaches. Yet again, these four great psychologists, were passionate about their new therapeutic endeavours, and never settled never settled with conclusion - their entire lives were spent in earnest search for better understanding of the human psychological frailties and their betterment (Goodwin, 2008). Though, their different passionate approaches give a rich base for new studies.

Carl Jung thought dreams contained significant insight into people's psyche and theorized that for people to become whole, they must be taught to integrate the unconscious with the conscious mind in a process he called individuation (Malamud, 1923)

Jung (1964) argues that a word or an image is symbolic when it implies something more than its obvious and immediate meaning. We use symbols to represent concepts that are beyond our comprehension. There are unconscious aspects to our perception of reality, external events becoming psychic events within the mind that are evidently unknowable. Some events or part thereof, are not taken conscious note of and later well up into the conscious, frequently in the form of a dream. Here, with this statement, Jung emphasizes the importance of dreams in consideration of his approach to unconsciousness. (Approaching the Unconscious, 1964) Furthermore, Jung (1964) notes that unconsciousness within the psyche is common to all humanity which is pretty similar to Jung's social aspect of unconsciousness.

Though Jung shows some unique opinions, he also mentions about similar thoughts just like Freud.

The unconscious consists of memories, usually emotional residues, of past experiences that are located beyond the threshold of conscious recall but may be triggered at a moment's notice. Carl Jung (1964)

Most of the time, Freud was the only one who had emphasized about the memories which are recorded in unconscious mind. Because his claim was that unconscious mind might be affecting our behaviours without our awareness.

Carl Jung and Collective Unconscious Theory

Jung, the father of analytic psychology, was one of the greatest challengers in psychology science. That so, it's really important to define his theory in scientific terms.

According to Mills (2012), the collective unconscious is a term Jung uses almost interchangeably and synonymously with the archetypes and is in essence a spacing, container, or receptacle that symbolizes world human experience. Furthermore, Jon Mills notes that the fact that the collective unconscious mind may symbolize a universal culture which is common for all individuals, anthropological images, practices, edicts and sort of values that embody a society.

Piepmeyer (2007) defined collective unconscious as it's a condition of a subject within the whole society, and how any given individual comes to view himself/herself as a part of a given group. This view has been emphasized in previous parts, too. By this definition, it's possible to claim that, social groups and structures might affect individuals unconscious mind. According to Piepmeyer (2007), Carl Jung coined the term collective unconscious to denote the shared contexts and meanings of individual's dreams. Such idea also was given in previous parts and this might be the main reason why Jung was studying about unconscious mind at all. Because, as

it's known by many, Jung has spent a lot of effort to interpret dreams with his unconscious approach.

Collective Unconscious Model

Adamski(2011), who is the author of Archetypes and the Collective Unconscious of Carl G. Jung in the Light of Quantum Psychology, notes that Jung had an opinion that our conscious is formed by four functions, which are thinking, feeling, perception, and intuition, though the individual unconscious may contain subliminal and suppressed contents.

However, he continues, collective unconscious contains instincts and archetypes, or symbols, which are physically inherited from our ancestors. This view of Jung could be interpreted as it was the first essence of the thought of social aspect in terms of collective unconscious.

In terms of Jung, archetype is intended to mean the original, main idea, and a certain pattern determining human development and it should also include the law governing this development, which focuses on three levels: inside the mental, interpersonal, and the law relating to the relationship between the psyche and the outside world (Pascal, 1992).

According to Adamski (2011), archetypes are a bridge to the real world's spirit, though instincts connect individuals to the reality of the matter. On this matter, Clarke (2010) shares different opinion and he claims that an archetype is an idea that has been stamped on the human brain for ages.

It would be said that Adamski interpreted archetype as it's a notion that can be later learned but Clarke has claimed all people has been born with archetypes.

Also, there is an understanding that comes from Jung's writings which is that all children who are new born have archetypal genetic potential. This means that humans inherit the archetypes from their parents.

Following, Adamski (2011) notes that archetypes are commonly heritage of mankind. And those archetypes are not just determining the behaviours of individuals, but they also transmit human personality.

For furthermore understandings of collective unconscious theory of Jung, it's really essential to understand his theory of individuation. Clarke (2010) had emphasized on that when he explains his opinions on the matter of collective mind theory which he states that for the sake of mental health conscious and unconscious mind should be integrated and Jung calls this process 'individuation'

A blog writer and researcher Cloosterman defined individuation as it's a process of transforming one's psyche by bringing the personal and collective unconscious into conscious by referring Jung's opinions.

On the other hand, Daniels (2011) defines individuation as the goal of life, the process of coming to know, giving expression to, and harmonizing the various components of the psyche. Though he defines individuation process, he gives also the way to achieve it which is to realize our uniqueness.

Lacan and His Unconscious View

Lacan is a French psychiatrist and psychoanalyst who have worked about human mind. His discoveries pointed out that certain cases cannot be explained by somatic aspects. He claimed

that in order to understand a psychiatrist patient, it's not enough to understand human body but also condition in general.

According to Homer (2005), Lacan is one of the most challenging and controversial to thinkers like Freud. And he stated that Lacanian theory has got over the consulting room to engage with different disciplines as literature, film, gender and social theory.

Again Homer claims that over 50 per cent of the world's analysts use the method of Lacan, because Lacanian method is related, not only with physiology and psychiatry, but also related with different social sciences and disciplines and it gives a greater perspective for the understanding of psyche and psychology of mind.

Dr. Qazi (2011), who had published an article about Lacanian concepts, pointed out main arguments in Lacanian approach and he pointed out that unconscious mind is structured like a language. This view can be seen also in different authors articles. Sean Homer (2005) stated almost the same sentence for the explanation of Lacan's theory of unconscious.

Cloosterman also shared almost same opinions like Homer and Qazi. Beside that by referring Lacan's views, she pointed out that the unconscious is not primitive and archetypal part of the mind separate from conscious, but it's a complex formation and linguistically sophisticated as conscious itself.

Cloosterman interpretations followed thoughts related to Freud. According to her Lacan's theory of unconscious pop up from Freud's interpretations of dreams. And she pointed out that Lacan's linguistic unconscious theory was re-readings of Freud's works on the matter of dream interpretations.

For a better understanding of Lacan's linguistic unconscious theory of mind, Qazi (2011) emphasized the importance of the terms which are condensation and displacement.

In Qazi's definition, both of the terms are somehow related to linguistic phenomena and he defines condensation as its akin to the unconscious process of condensation which is the process that bring dissimilar things come together, and displacement is akin to the unconscious process of displacement that it's a process replace a person or an object for another.

According to Qazi (2011), with this aspect in Lacan's theory, Lacan believes that Freud's theories and concepts of unconscious symbolism depends on word plays, puns, and other associations with are mostly verbal.

Adlerian Unconscious

Adler is one of the best known psychologists in the world. He was born in Vienna in 7th of February, 1870. Although most of his views were pretty much controversial to Freud's theories, he was a participant of Freud's discussion group in 1907. Mitchell makes a quotation from the book 'Individual Psychology', 1930, to enlight Adlerian Unconscious View ;

"There appears to be no contrast between the conscious and the unconscious, that both cooperate for a higher purpose, that our thoughts and feelings become conscious as soon as we are faced with a difficulty, and unconscious as soon as our personality requires it."

So to say from this quotation, it can be concluded that both conscious and unconscious minds are actively working when they are necessary for the needs of individual. Supposing, a person's flat is on fire and most likely the individual first would think how to get rid of the fire, and the answer is to call the fire fighters as soon as possible. In this case individual's behaviour to call the fire fighters is the result of conscious thoughts and feelings. On the other hand, unconscious is more likely related to individual's personality. If the person whose flat is in fire, in previous example, was an anxious person, his unconscious mind would make him to find another solution to the situation which might be like running away from the flat first and then calling the fire fighters. This might be the behaviour which is based on personal traits.

Freud's Theory about Unconscious Mind

The unconscious is the larger circle which includes within itself the smaller circle of the conscious; everything conscious has its preliminary step in the unconscious, whereas the unconscious may stop with this step and still claim full value as a psychic activity. Properly speaking, the unconscious is the real psychic; its inner nature is just as unknown to us as the reality of the external world, and it is just as imperfectly reported to us through the data of consciousness as is the external world through the indications of our sensory organs.

SIGMUND FREUD, Dream Psychology: Psychoanalysis for Beginners

Sigmund Freud was born in a small town in Poland, Freiberg, May 6th 1856. As a student, he was brilliant in school and this success of his took him to medical school. During his education in Vienna, he got involved with research under the control of Ernst Brücke. With this research, Freud had studied neurophysiology and even he invented a special technique called cell-staining. In a period of time, Freud worked with Joseph Breuer who had a lot of effect on Freud's thinking, and he started learning hypnosis. With the help of Breuer, Freud studied dreams and mind over the years.

Many modern psychologists states that Freud was not the inventor of the ideas on the matter of conscious and unconscious mind but he was the one who made these terms so popular by his theory. (Dr. C. George Boeree, 2009)

According to Dr. Boeree (2009), the conscious mind is what people could be aware of at any moment, such as; present perception, thoughts, emotions, memories and etc. Furthermore, Dr. Boeree explains the working state of mind, which is close to conscious mind, preconscious mind as available memory.

On the matter of unconscious mind, Dr. Boeree (2009) points out by referring to Freud's views that it's the largest part of the mind of individuals. Dr. Boeree claims that unconscious mind contains all the informations that are not easily available to bring up to conscious mind, such as our drives and instincts. Furthermore, Dr. Boeree (1997) noted that Freud's unconscious is the source of people's motivation, whether they desire for food, love, sex, or any kind of human needs.

Conscious, Unconscious, and Preconscious

These three terms, conscious, unconscious, and preconscious, are the main stones of the structure of Freudian theory of mind. Without understandings of these terms, psychoanalysis would be

placed in fog and may not be that much popular. Till Freud, there mainly few people who had emphasized on these matters.

Freud says that knowing conscious mind and descriptions on this matter is very important and many people are satisfied with the fact of conscious and with the assumption that conscious is mental and nothing remains for psychology but to discriminate in the phenomenology of the mind between perceptions, feelings, intellectual processes, and volitions.

From this statement, it can be said that main starting point of many schools of psychology can be based on the fact of conscious, and all can be based defining and describing process of what is mental in correlation of conscious mind.

From that point, Freud (1940) points out that the things in conscious can be repeated and there is a capacity of entering back or flashing back to conscious which might be called preconscious. So to say, feelings, thoughts, and intellectual processes which are passing back to conscious are mainly from preconscious.

By referring Freud's definitions, it's understood that what is present at any moment is related to people's conscious mind. And things that people can recall or remember are stored in preconscious. So, there is one unknown term which many struggled to define, which is called unconscious.

Freud (1940) says that there are other mental processes which have no easy access to conscious matter, but which much be inferred, discovered, and translated into conscious form in a manner. And the name of unconscious is reserved for such material.

In relation to unconscious, Power (December, 2000) states that the unconscious is playing a descriptive role, by referring Freud, and adding that because of this view many earlier accounts of unconscious had seen it as a 'storehouse' of forgotten memories which may or may not remembered again.

Bargh (2013), who wrote an article about unconscious mind, says that Freud's body of work emphasizes the conscious as the locus of rational thought and emotion, and the unconscious is the lair of the irrational.

As it could be seen in different aspects of different psychologists, the matter of unconscious is huge and it's always taking attention on itself to be discovered more and more. Yet again, few of them survive the huge ocean of unconscious.

ID, Ego, Super-Ego

These three terms may be heard lots of times when it's about Freud and its theory of mind and the theory of psychoanalysis. Jun-Woo Kim (2001) stated that Freud's theory of unconscious mind is best illustrated by his tripartite model of structure of the mind. And also claims that this tripartite model is pretty much similar to Plato's mind structure mentioned terms.

According to Kim (2001), the ID is that part of the mind which consists instinctual sexual drives which require satisfaction. And he says that super-ego is the part of conscience which means it's more likely to a social control mechanism. And ego is the conscious self of individual, which is charged to create the interaction between ID and super-ego. (2001, Freud; the Structure of Mind) On the other hand, Freud(1940) defines the ID as it's a chaos going on in unconscious mind and it seeks for satisfaction for instinctual needs, in accordance to pleasure-principle. According to

Freud (1940), in the id there is no negotiation, nothing corresponding to the idea of time, no recognition passage of time.

To characterise ego, Freud (1940) states that it's the system directed on the external world, and it mediates the perception of external world. Freud emphasizes that ego is the sense organ, and it has taken over the task of representing the external world for behalf of id.

On the other hand, for the explanation of super-ego, Freud says that id has been watched out by super-ego which holds up certain norms of behaviour. According to Freud if these norms are not acted, super-ego starts punishing the ego with feelings of tension which manifest themselves as the feeling of guilt. In this way, the ego struggles to provide a harmony work with id and super-ego.

Definition of Intelligence

In creation of humans, God gave a different property to human kind. In the world, the only creator which can think, talk, think, learn, and make decisions by their own will, is human kind. All these features are proceeding in animals by instincts. And this is the most superficial difference between humans and all other creators. That so, intelligence is one of the top topics in history of psychology.

Legg and Hutter (2007) had collected the definitions has been made in different fields, and state that the definition of intelligence has been suffering during the whole time of humanity, and there are only approximate definitions.

In their research, Legg and Hutter, gathered collective definitions, psychologists definitions, and artificial intelligence researchers definition all in together.

According to that paper, in part of collective definitions, American Psychological Association defines intelligence as it's an ability to understand complexities, to adapt effectively to the environment, and to learn from experience, which differ among individuals. (A Collection of Definitions of Intelligence, 2007, p.3)

Another collective definition made in Encyclopaedia Britannica (2006), which says; intelligence is an ability to adapt an environment, either by making a change in oneself or by changing environment or finding new one, and intelligence is no single mental process, but it's a combination of different mental processes.

Psychology is a social science which studies human mind, thoughts, and behaviours with different measurements and techniques. So the perception in psychology might show different aspects in terms of defining intelligence. Piaget defined intelligence as "its assimilation to the extent that it incorporates all the given data of experience within its framework. There can be no doubt either, that mental life is also accommodation to the environment. Assimilation can never be pure because by incorporating new elements into its earlier schemata the intelligence constantly modifies the latter in order to adjust them to new elements."

Boring defined intelligence in a short manner and he says that intelligence is what is measured by intelligence test.

Binet who has created an intelligence test with Stanford defined intelligence as; "It seems to us that in intelligence there is a fundamental faculty, the alteration or the lack of which, is of the utmost importance for practical life. This faculty is judgement, otherwise called good sense, practical sense, initiative, the faculty of adapting one's self to circumstances."

And at the end, Legg and Hutter (2007) gave some examples of artificial intelligence researchers definition of intelligence. There almost 20 different definitions in this part. As an example, Gudwin states that intelligent systems are expected to work in many different environments, and the property of intelligence allows them to maximize the probability of success even if full knowledge of the situation is not available.

Poole defines intelligence as it's an agent which adopts the circumstances of the present environment and its goal to learn from experiences, it makes appropriate choices given perceptual limitations and finite computation.

From the very beginning of the researcher of intelligence, there have been questions to clarify the uncertainty of intelligence, though most psychologists and researchers claim that it's mostly in fog. There is no certain and sharp defining way for intelligence. In psychology study, what has been thought to students mostly the definition of Boring, or Binet.

Learning, Memory and Intelligence

As it was defined by different examples in previous part, intelligence is a capacity of an individual to adopt an environment, and it's a process of learning from experiences. Because of that learning and memory might be recognised as terms related to intelligence.

Learning is a mental process that humans can earn in everyday situations. This is explained in different ways by different researchers on the field of psychology. According to Raygor the main principle of learning might be explained in everyday behaviours. And to consolidate this statement, he gives examples of learning of walking, eating, sitting of new born babies.

As a technical term, Raygor (2005) defines learning as it's a relatively permanent change in behaviour due to experience by referring general ideas of psychologists. From that definition, it might be concluded that to claim of anything as it's learned, there has to be a certain change for long time in considerations of behaviours. Driving a car, writing, even different thinking ways can be recognised as learnings.

Memory is an important part of mind which might be highly related to learnings. Because, as learnings required to be long termed changes in behaviours, the informations of learnings should be stored in somewhere which might be called memories. But memories are not only the storages of learned behaviours. Dreams, hobbies, people's faces, phone numbers, and etc. can be stored in memory.

Tulving (1989) has pointed out the definition of William James in his research which says that memory is the present conscious awareness of an event that has happened in the rememberer's past.

This statement of William James is showing the perception of memory as it's an ability to remember or recall the personal experiences of individuals that are coming from his/her own pasts.

It's been discussed in the previous chapters that intelligence is the ability to learn, to achieve to adopt a new environment with single or multiple process. Learning is a permanent behavioural change of an individual and memory is the storage of all informations adopted by a human kind. With all due respect to all opposite opinions, there is a strong connection seem to be happening between these three terms.

Yet again, this issue has been argued all over the years but certainty of the conclusion is not significant.

For furthermore understanding, it could be examined the intelligence test of Wechsler. WISC intelligence tests were first published in 1939 and it was designed to measure intellectual performance by adults. And these tests are highly standardised and accepted by the whole world's psychologists. There are four major parts such as ; Verbal Comprehension Index (VCI) which measures the ability of listening a question and drawing upon learned information, Perceptual Reasoning Index (PRI) which measures the ability to examine the ability of problem solving, organising thoughts and etc., Working Memory Index (WMI) which measures the ability to memorise a new information, to hold it in short term memory, concentrate, and manipulating ability for the purpose of reasoning processes, Processing Speed Index (PSI) which measures the speed of information processing of an individual.

As it would be understood from the major parts of WISC test the main emphasize of measurements is to measure the abilities on memory and learning processes of individuals. So this might be recognised as a sample for evidence for the relations of the terms of memory, learning and intelligence.

Critical Thinking and Analysis of the Relationship between Unconscious Mind and Intelligence

The definition of genius is that it acts unconsciously; and those who have produced immortal works, have done so without knowing how or why. The greatest power operates unseen, and executes its appointed task with as little ostentation as difficulty.

– William Hazlitt

With all due respect to Hazlitt's definition, it would be claimed that he believed there is a greater potential, not yet discovered, and many who have achieved great things done those either without being aware, or they were supported by their unseen potential in process of making it.

That so, there might be a certain relationship with unconscious mind and intelligence. On the previous chapter, there are examples of evidences which show the relationship between learning, memory and intelligence. Here, these terms are about different complex processes which individuals are aware.

When students try to learn alphabets, they pay attention with their conscious mind, and they store the new coming informations in their memories.

Repetition keeps those informations in their long-term memory and then they might be recognised as learned knowledges. All these processes connected to conscious mind which means these processes require awareness. But what happens the other things that individuals are not aware? According to Freud's theory of unconscious mind, all the rest informations which are caught by individuals brains go to unconscious mind. (Dewey, R.A. , 2007)

In consideration of the processes going on in unconscious mind, it might be claimed that unconscious mind go through the same or similar procedures like conscious intelligence, and so, there are only few differences in terms of learning and memorising knowledges. From this point of view, it also might be concluded that, there is an existing unconscious intelligence.

Searching an Answer to Great Question; is there unconscious intelligence?

The term of unconscious intelligence is not a popular subject in psychology science, because it reveals lots of question following the subject. Psychology, from the very beginning of its history, mostly deals about the way of learning, the memories, human perception, human emotions, intelligence, mental disabilities and etc. When it comes to the topic of unconscious intelligence, many researchers try not to attempt to define it because its greater topic than it can be guessed. Separately, both terms are never certainly defined.

When people see a person reading a book in few seconds, it might be concluded that the person is highly intelligent. But the question is 'Is it just the intelligence playing a role within such talent?' or 'Could the person be using another types of his/her intelligence capacity, and capacity of mind?' These questions are while reading sound so great and indefinable.

Koch (2011), who has wrote an article about unconscious mind, mentions two different researches about unconscious mind's capacity, or to say unconscious intelligence. Opstal, Lange, and Dehaene, who study different aspects of human mind with scientific experiences. According general views, adding different numbers such as 7,3.5 and 8 is widely accepted as its quintessential process that requires consciousness.

Opstal and his colleagues try to prove opposite of this common assumption. In their research, they projected serial of Arabic numbers on to a screen from 1 to 9, excluding 5, and their participants was asked to express if the shown 4 numbers projected are exceeding 5 or not, as immediately as possible. The most interesting part on this experiment is that Van Opstal put hidden cue which could be valid or invalid, and the cue was consisting different four numbers whose average was either smaller or larger than 5, which was flashing and no subject ever consciously saw this quarter. However forcing participants to guess the result didn't work well, they found out the influence of the hidden cue on the given responses. (Christof Koch, 2011)

According to Koch (2011), the hidden cues influence behaviour implies that the unconscious can somehow estimate the average of four single digits on the research.

From that view of his, it might be claimed that unconscious has intelligence and it works separately from conscious intelligence. Also, the view of Koch, can be ground for the understanding of subliminal messages way of working.

Another research have been done by William James Sidis on the matter of unconscious intelligence. (1914, Unconscious Intelligence) Indeed, he might the first one who claimed the term and defined it.

According to Sidis (1914), there are two theories to explain the phenomena of unconscious. One of these is that there is consciousness performing all the acts of intelligence which are called subconscious and the other one is that these acts are the result of unconscious intelligence, which consists of purely physiological processes, and he claims that, by referring two theories, there are no differences between unconscious intelligence and those of conscious intelligence.

Furthermore, Sidis gives an example of the way of working for unconscious intelligence, which claims that unconscious intelligence reads and remembers. For the purpose of being clear, he explains his own personal experience about the matter of unconscious intelligence. In March, 1911, when he was walking down on a street, he suddenly starts thinking about Virgil's Aeneid, and his attention shifted away for the expression 'Alma Venus' which Sidis remembers that he

read it on a poem. At the beginning he thinks of the meaning for the word of 'alma' and he didn't know why he was thinking about it.

When he was on the same block, he notices an apartment called 'The Alma'. From that memory of Sidis, he (1914) says that the unconscious intelligence can read and remember by itself because the name of the apartment recalled his memory of reading a poem which was about a half year ago.

Sidis claims that since unconscious intelligence also can read, remember and reason by itself, then there is no difference between conscious and unconscious intelligences by referring the rule of isomorphism, and it doesn't need a proof in the Supreme Psychological Court. (Unconscious Intelligence, p.7)

Is there a way to control unconscious intelligence?

"We think of intelligence as a deliberate, conscious activity guided by the laws of logic. Yet much of our mental life is unconscious, based on processes alien to logic: gut feelings, or intuitions." **Gerd Gigerenzer**

Human kind has overcome many challenges in the history. When firsts, Adam and Eve sent to the world, challenged with each other. Because the different genders got together, to live and survive together. Then challenged the nature, because the opportunities now and then were pretty much different. All the time is a great progress in terms of the invented technologies. Homo sapiens were first hunting with their hands then they used rocks, and then created other materials which were sharper. Human kind was not improving their environment but also they were developing in terms intellectual abilities.

On the previous chapters, intelligence, learning, memory has tried to be defined by referring scientific terms, and has tried to express the relationship between conscious, unconscious and intelligence. After all, a great question came to the light; is there any way to control the unconscious intelligence?

Some people would answer 'yes' and some people would say 'no'. Handel (2010) who published an article online claims that arguing and discussing about unconscious intelligence and intuition is still a taboo or many of scientists in Western psychology. His point might be true at some aspects because it was such challenge in the past before Freudian theories came to light.

Leonardo Da Vinci is one of the geniuses the world has ever known. His brilliance has been seen many times in different ways such as, art, engineering, social philosophy, anatomy and etc. There is a question that comes out from his amazing talent; how did he manage to become that much successful in different areas?

Gelb (1998), who wrote a book named 'How to Think Like Leonardo da Vinci', claims that there were fundamental systems and disciplines that Da Vinci used over his thinking way. Those principles called as da Vincian principles listed below;

Curiosità—an insatiably curious approach to life and an unrelenting quest for continuous learning.

Dimostrazione—a commitment to test knowledge through experience, persistence, and a willingness to learn from mistakes.

Sensazione—the continual refinement of the senses, especially sight, as the means to enliven experience.

Sfumato (literally “Going up in Smoke”)—A willingness to embrace ambiguity, paradox, and uncertainty.

Arte/Scienza—the development of the balance between science and art, logic and imagination. “Whole-brain” thinking.

Corporalità—the cultivation of grace, ambidexterity, fitness, and poise.

Connessione—A recognition of and appreciation for the interconnectedness of all things and phenomena. Systems thinking.

These seven principles of da Vinci are pretty much applicable and they might be used in controlling unconscious intelligence. There is no scientific evidence but even da Vinci might be reached the control of unconscious intelligence by these seven principles. Being curious about anything around, being open minded of any sort of knowledge, failing, free thinking, imagining, experimenting might be even recognised here within da Vinci’s principles.

Goldman (2011), who calls himself as mind power expert also made a list for the purpose of controlling the unconscious intelligence as follows;

- Listen to your intuition – The subconscious often tries to give you messages through your intuition. Often these messages come as feelings about a subject or person. Intuitive feelings are sometimes referred to as ‘gut reactions’ or ‘gut feelings’. When you have one of these message come through, pay attention to it. Follow your intuition. The more you do, the more often you will get messages.
- Listen to your dreams – The language of the subconscious is in dreams. When you are able to hear, see, or feel the messages in your dreams you are communicating with your subconscious. Keeping a dream log and looking for clues or repeating patterns will help to develop this connection.
- Start a visualization practice – A visualization practice will not only help your subconscious come forward, but your imagination to flourish; which is vital in communicating with the subconscious. A simple visualization exercise is to set something in front of you; like an apple. Look at that apple with your eyes for several minutes and then close your eyes, but continue to ‘see’ the apple.
- Watch your self-talk – If you are constantly giving yourself negative messages then you will have a much harder time succeeding. Take time to say positive affirmations to yourself every day.
- Do something creative – The subconscious loves to be creative. Find an art modality that appeals to you and practice it.
- Learn about the subconscious – The best way to start working with something is to understand how it works. Take a psychology course or read books and articles on the subconscious and conscious minds.
- Meditate, meditate, meditate – One of the most powerful ways to connect and control your subconscious mind is to learn how to listen to it. The best way to do this is through

meditation. In a mediation practice you are getting your talking self to quiet down; which will enable you to hear the deeper messages from your subconscious self.

By referring his listing on the matter of controlling the unconscious mind power which might be also called unconscious intelligence, meditation is one of the most powerful one. Meditation as he explains is a way to connect unconscious mind and to listen it.

From that point of view, it might be concluded that by meditation a person might be able to recall the informations stored in unconscious mind whenever he/she needs. That would probably be the most amazing thing an individual could possibly do. Meditation also might be helping a person to create a gate between conscious and unconscious mind, by referring its general perception.

Conclusion

‘We have certainly created man in the best of stature’ / Surat At-Tīn 95:4

There is no doubt that God has ever created a better creator in this world than mankind. From the first generation of mankind, God has given a great structure to them to use their abilities and improve their selves and to survive in their survivals. Thus, it might be seen in Quran, the holly book of Islam, God says with words that mankind was created in the best stature.

That means the potential is greater than it’s been discovered. And science, as a matter is not limited. So, there millions of discovers await for the sake of humanity.

Mind is a great phenomenon in anyway still to be discovered. Freud’s, Jung’s, and Lacan’s contributions could come to a particular point. Then its future scientists job to improve their contributions.

In the previous parts, it’s been discussed the main structure of mind, the main structure of conscious mind and unconscious mind, the theories of it, intelligence, and at the unconscious mind by referring the psychologists views.

Albert Einstein is a great scientist who is really famous with his physic theories, and his teacher in elementary school said that he is mental retarded. Thus, his mother took care of his education at home. Related to his unique intelligence, there is a myth that many people know about that Einstein was using only 10% of his brain.

Jarret (2013) pointed out that the myth is not true and stated that for many people, the 10 percent myth sounds both feasible and appealing because they see it in terms of human potential.

“The intuitive mind is a sacred gift and the rational mind is a faithful servant. We have created a society that honours the servant and has forgotten the gift.”

— Albert Einstein

On the other hand, Albert Einstein’s quote emphasizes the importance of the part of people are not aware cause of their rational minds. His saying of ‘the gift’ might be a reflection to the unlimited potential that is given but not used by humans.

In consideration of unconscious intelligence, there are millions of gaps that must be full filled by the scientists.

It’s been tried to answer the main question that is examined in the paper and it’s been provided answers that would prove the existence of unconscious intelligence. But examination and critical analyses might not be enough. The beginning of psychology started with experiments and also

experiments should be adopted on this research for furthermore findings. That way, examination would be proved, and this topic might even be providing great benefits to humanity. Conquest of human secret potential would open different ways to improve people's lives and improve the environment that they live in.

Yet again, the main idea of the concept requires lots of hard work. As, all people believe, nothing is impossible. Especially when God says that he has created the best creator, Human.

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Part II

Social and Political Sciences

The importance of Human Security in Balkan Countries Development

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Introduction

Security has been a concern both for individuals and states since the beginning of human history. Security is 'the condition of being protected from or not exposed to danger, a feeling of safety or freedom from absence of danger. Security is seen as an indivisible and described as a comprehensive approach. Security is defined differently across continents and organizations.¹ Since the Peace of Westphalia, the dominant military paradigm has framed security in terms of the protection of a nation's territorial boundaries from violent assault.² Security issues were examined in the context of "state security" the protection of the state, its boundaries (its sovereignty and territorial integrity which is connected with international stability and security concepts), people, institutions and values from external attacks. The period since the end of the Cold War has been neither peaceful nor secure.³ The unit of analysis was the physical territory of the country and the focal variable was territorial aggression. The human security paradigm shifts the *unit of analysis* from the territory to the human beings who dwell within them. It broadens the focal variable from one single threat-that of territorial aggression - to the multiple threats that could undermine people's security, dignity and livelihood – their vital core human security looks at who is insecure and in what dimensions.⁴ In the early 90 s the security researchers and analysts started to focus on the non-military aspects of the security of states (social, ecological, cultural and so on). The Cold War rivalry called for and prioritized the protection of sovereignty and territorial integrity of nation-states, the last decade of 20th century saw a rapid increase in the importance of new concepts such energy security, economic security, ecological security, cyber security and others.(including human security). In addition, state institutions and the international community as whole – Western democracies in particular saw themselves in the need to counter the development of new threats, e.g. international terrorism, proliferation of weapons of mass destruction, environmental disasters, energy extortion and organized crime. Thus, as dictated from human security paradigm, the state institutions are obliged to create conditions in which an individual can be "free from fear" and "free from deprivation." (Paris, 2001; Buzan, 2007)⁵ Threats to individual security are seen to arise not only from external threats (threats from other states) as traditionally characterized by war and conflict but also *internally* from violent actions of the state itself as well as by structures of violence and oppression which inhibit the realization of human dignity and freedom.⁶ The end of

¹ Monica Den Boer & Jaap de Wilde, (eds.) *The Viability of Human Security*, Amsterdam University Press, 2008.p. 59

² Alkire Sabina, Human Development Research Paper 2010/01, *Human Development: Definitions, Critiques and Related Concepts* UNDP, June 2010 p.59

³ Dr. Paul Cornish ,Catham House *Threats to International Security in 21st Century*, p.2

⁴ Alkire Sabina, Human Development Research Paper 2010/01, *Human Development: Definitions, Critiques and Related Concepts* UNDP, June 2010 p.60

⁵ Robert Ondrejcsák (ed.) *Introduction to security studies, Bratislava 2014* p.161 Centre for European and North Atlantic Affairs (CENAA)

⁶ Giorgio Shani The Journal of Social Science 67 (2013) pp.5-25 *From National to Human Security? Reflections on Post 9.11 Japan*, p.6

the Cold War has changed the perception of the security understanding. From that moment the life of the individuals was not solely menaced by wars and international conflicts but also from criminal organizations, terrorism, environment degradation, infective diseases, chronic poverty, weapons of mass destruction and economic underdevelopment. Freedoms are not only the primary purposes of the development but they are also among their means to achieve development.⁷

The concept of human security

The most striking thing about the concept of human security is that it was born in the policy world, and did not come from either academics or analysts.⁸

The concept of human security was first suggested by Dr. Mahbub ul Haq in the Human Development Report 1994 of the UNDP and supported at the World Summit for Social Development. UN Human Development Report (1994) According to this report, human security consists of two elements “freedom from fear” and “freedom from want”.⁹ This concept is based on the vision of people security to ensure the necessary security for national security, regional and international security (global). The human security differently from traditional idea of security (state-centered) is concentrated on persons the main focus is on the human beings; it aims the individual’s protection, by expanding the protection from a wide range of threats. The state is not the unique subject that guarantees the security and the realization of human security implicates a wide range of participation of different international actors such as regional and international organizations, non-governmental organizations and local communities.

As president Roosevelt proclaimed in 1941 freedom from fear the years that have passed since that time and have proven this regularity. The fear is a reality on earth, in the conditions in which the people live. The fear makes people unable to decide freely.¹⁰ The Universal Declaration of Human Rights (1948) preamble refers to the freedom from fear and freedom from want. The same approach is inherent in the concept of human security.¹¹ Human security addresses two main issues that form the vital core of human lives “freedom from fear (violent conflict)” and “freedom from want (deprivation)”. Human security requires an integrated approach that incorporates both aspects. Freedom from fear such as conflicts and terrorism, natural disasters and environmental degradation, infectious diseases and economic crisis and freedom from want such as that resulting from poverty, malnutrition, lack of education, health and other social services, underdevelopment of basic infrastructure ect. Secure states do not automatically means secure people. Many people have been killed by their own governments than by armies from abroad. Human security complements national security; it protects people and society from

⁷ Sen Amartya, *Development as freedom*, Publishing House Dudaj, Tirane, 2009 p.31

⁸ Krause Keith, *Towards a Preactical Agenda of Human Security*, Geneva Centre for the Democratic Control of Armed Forces (DCAF) Policy paper-No.26, 2007, p.2 www.dcaf.ch/publications

⁹ *Poverty Reduction and Human Security, Incorporating the concept of human security in poverty reduction*. Institute for International Cooperation, Japan International Cooperation Agency, Tokyo, Japan 2006 p. 3

¹⁰ Prof. Dr. Ejup Statovci, *Human Rights and Fredoms*, p.131 University of Prishtina, 2009

¹¹ Wolfgang Benedek (Edited by), *Understanding Human Rights Manual on Human Rights Education*, European Training and Research Center for Human Rights and Democracy (ECT) 3rd edition 2012, Graz p. 31

multiple threats affecting human life, livelihood and dignity. Human security aims to strengthen people's ability and achieve freedom and realize their potentials. It protects the vital of all human lives in ways that enhance human freedoms and human fulfillment.¹² Human Security is not a concern with weapons- it is a concern with human life and dignity.¹³ The concept of 'human security' emerged out of the recognition that individuals and communities' security does not necessarily follow from the security of the state in which they are citizens. On the contrary, the genocidal records of some states and the gross injustices in the distribution of resources in others suggest that states can constitute a major threat to their own citizens' well-being. If governments fail to cope with persistent poverty and illiteracy, their policies become a source of insecurity by lowering people's life expectancies and decreasing their opportunities.¹⁴ **Human security integrates three freedoms:** freedom from fear, freedom from want and the freedom from indignity. • **Freedom from fear** refers to protecting individuals from threats directed at their security and physical integrity and includes various forms of violence that may arise from external States, the acts of a State against its citizens, the acts of one group against others and the acts of individuals against other individuals. • **Freedom from want** refers to the protection of individuals so that they might satisfy their basic needs and the economic, social and environmental aspects of life and livelihoods. • **Freedom from indignity** refers to the promotion of an improved quality of life and enhancement of human welfare that permits people to make choices and seek opportunities for that empower them.¹⁵ **Principles** Human security is based on the following principles: • **People-centered.** Human security places the individual at the center of the analysis and, therefore, considers conditions that threaten their survival, livelihood and dignity. • **Multi-sectorial.** Human security is based on a multi-sectorial understanding of insecurities and, therefore, in addition to national security it entails a broadened understanding of threats and their possible causes related to economic, food, health, environmental, personal, community and political security. • **Comprehensive.** Human security implies a comprehensive focus that emphasizes the need for cooperative and multi-sectoral responses that bring together agendas on security, development and human rights. • **Context-specific.** Human security acknowledges that insecurities vary considerably across different settings and, therefore, promotes the search for contextualized solutions that appropriately respond to each particular situation. • **Prevention-oriented.** In reaching the risks and root causes of insecurities, human security is aimed at prevention and introducing strategies of protection and empowerment.¹⁶

Human security emphasizes the interconnectedness of threats and responses to them in two ways. "First, they are interlinked in a domino effect in the sense that each threat feeds on the other. For example, violent conflicts can lead to deprivation and poverty which in turn could lead to resource depletion, infectious diseases, education deficits, etc. Second, threats in a given country

¹² *Poverty Reduction and Human Security, Incorporating the concept of human security in poverty reduction.* Institute for International Cooperation, Japan International Cooperation Agency, Tokyo, Japan 2006 p. i,ii p.3

¹³ *Human Development Report 1994*, Published for United Nations, Oxford University Press, 1994
<http://hdr.undp.org/en/reports/global/hdr1994/chapters>

¹⁴ Bilgin Pinar, *International Studies Review, Individual and Societal Dimension of Security*, 2003, 5, 203-222, p.213

¹⁵ <http://3phumansecurity.org/site/component/content/article/34-projects/94-what-is-human-security>

¹⁶ <http://3phumansecurity.org/site/component/content/article/34-projects/94-what-is-human-security>

or area can spread into a wider region and have negative externalities for regional or international security".

Among the most vocal promoters of the human security are the governments of Canada and Norway, which have taken the lead in establishing "Human Security Network" of states and non-governmental organizations (NGOs) that endorse the concept.¹⁷ As noted in the 2nd Ministerial Meeting of Human Security Network in (Lucerne May 2000) most threats to human security reveal a direct or indirect human rights dimension. Human rights provide a basis for addressing societal and global problems. The world can never be in peace unless people have security in daily lives. UNDP 1994 Human Development Report¹⁸

Human security dimensions and four essential characteristics and human rights

The UNDP 1994 report developed this definition in relation to seven dimensions of human security: personal-*the threat includes various forms of violence*, environmental- *the threat is pollution, environmental degradation and resource depletion*, economic- *the threat is poverty*, political-*the threat is political repression and human rights abuses*, community- *the threat is to the integrity of cultures*, health-*the threat is injury and disease* and food security-*the threat is hunger and famine*.¹⁹ Also the report states that Human Security understands security first and foremost as a prerogative of the individual, and links the concept of security inseparably to ideas of human rights and dignity to the relief of human suffering. Human security moves the referent object from the state, to the individual or groups of people.²⁰ Human security complements state security, furthers human development and enhances human rights.²¹ Ensuring human security requires a scaled approach to address economic security, food security, health security, environment security, individual security, community security and political security.²² The human security dimensions are inseparable from security, development and human rights. Human rights and human security have the main focus the human beings. Human security is essentially based on human rights, as laid down in the Universal Declaration of Human Rights of 1948. Right to income Article 23(3), right to health (Article 25) UDHR 1948. It is understanding that human security stretches across all geographical areas-human rights are universal (cf. UDHR, up cit.) Human security is thus subject to potential threats in both developed and

¹⁷ Paris Roland, *Human Security Paradigm Shift or Hot Air?* International Security, Vol.26, No2 (Fall 2001), p.87-102, p1 <http://aix1.uottawa.ca/~rparis/Paris.2001.IS.Human%20Security.pdf> (Accessed on April 20,2015)

¹⁸ Ibid p.32

¹⁹ Alkire Sabina, "A Conceptual Framework for Human Security", Centre for Research on Inequality, Human Security and Ethnicity, CRISE, Working Paper 2 Queen Elizabeth House, University of Oxford, 2003 p.14

²⁰ Fell Mike, Journal of Security Sector Management, Cranfield University UK Volume4 Number 3, *Is Human Security our Main Concern in the 21st Century?* p.3 http://www.jofssm.org/issues/jofssm_0403_fell.doc

²¹ Ibid.,p.5

²² Collins Alan, *Contemporary Security Studies*, Oxford Press University, UET Press 2009. p.129

(i)*Economic security* means an assured basic livelihood derived from work, public and environmental resources, or reliable social safety nets. (ii) *Food security* means ready physical and economic access to basic food; (iii) *Health security* means access to personal healthcare and protective health regimes; (iv) *Environmental security* means safety from natural disasters and resource scarcity attendant upon environmental degradation; (v) *Personal security* means physical safety from violent conflict, human rights abuses, domestic violence, crime, child abuse, and self-inflicted violence as in drug abuse; (vi) *Community security* means safety from oppressive community practices and from ethnic conflict; (vii) *Political security* means freedom from state oppression and abuses of human rights.

developing countries; interdependence of people's fate is one aspect of globalization.²³ Human rights, humanitarian law and refugee law provide the normative framework on which the human security approach is based.²⁴

Human security and Human Rights

The interaction between human security and human right is of particular relevance. Human rights can be seen as an objective of human security as well as a means of measuring the state of human security, both with regard to freedom from fear and freedom from want. Human rights can be used as indicators for the level of human security. However, the concepts of human security and human rights are not identical. While human rights focus on the protection of the dignity of the individual, of human dignity, human security constitutes a wider approach, addressing the threats to the seven dimensions of security.²⁵ A rights-based approach to human security focusing on human rights like the right to a fair trial, the right to property and privacy, freedom of expression and of association strengthens the democratic setting of the state on the basis of the rule of law, good governance, and accountability. Human rights can be used both as an objective as well as a yardstick for the achievement of human security. A high degree of human rights performance is indicative also for a high level of human security. Respect for the human dignity of each person, regardless of their background, has to be the starting point. The absence of protection and provision of human rights can be taken as an indicator for the lack of human security. In a similar way, human rights are a requirement for human development, which serves all citizens equally.²⁶

Human security aims to ensure that people can live in safety and dignity. The concept of human security accommodates the considerations of wide range of threats to life, of which poverty is undoubtedly the most significant.²⁷ The objective of human security is to safeguard the vital core of all human lives from critical pervasive threats, in a way that is consistent with a long-term human fulfillment.²⁸ Human security means first safety from chronic threats as hunger, disease and repression. Secondly it means protection from sudden and hurtful disruptions in the patterns of daily life – whether in homes, jobs or in communities. Such threats can exist at all level of national income and development. UNDP 1994 23²⁹ Human security is not a concern with weapons- it is a concern with human life and dignity. The UN report identified four essential characteristics of human security

²³ http://dochas.ie/sites/default/files/hs_briefing05.pdf (Accessed on April 24,2015)

²⁴Wolfgang Benedek (Edited) *Understanding Human Rights Manual on Human Rights Education*, by, European Training and Research Center for Human Rights and Democracy (ECT) 3rd edition 2012, Graz . p. 32

²⁵ Wolfgang Benedek, Christopher Daase, Vojin Dimitrijevic´ and Petrus van Duyne *Transnational Terrorism, Organized Crime and Peace-building, Human Security in Western Balkans*, , Palgrave McMillan 2010, p.11

²⁶ Ibis.,p.12

²⁷ Hough Peter, *Understanding Global Security*, Routledge 2004, p.84

²⁸ Alkire Sabina, "A *Conceptual Framework for Human Security*", Centre for Research on Inequality, Human Security and Ethnicity, CRISE, Working Paper 2 Queen Elizabeth House, University of Oxford, 2003 p.2

²⁹ Daly Simon, Working paper no 30, *Geopolitical Change and Contemporary Security Studies, Contextualizing the Human Security Agenda*, Institute of International Relations, British Columbia University, April 2000 .p.5

- 1- Human security is a universal concern. It is relevant to people everywhere, in rich nations and poor.
- 2- The components of human security are interdependent.
- 3- Human security is easier to ensure through early prevention than later intervention. It is less costly to meet these threats upstream than downstream.
- 4- Human security is people-centred. The shift of referent objects from state to people. It is concerned with how people live and breathe in society, how freely they exercise their many choices, how much access they have market and social opportunities-and whether they live in conflict or in peace.³⁰ UNDP 1994 :23

One powerful vehicle of communication of human development idea has been the Annual Human Development Report produced by United Nations Development Programme (UNDP). The first report was published in 1990 (concept and measurement of human development) and all reports seek to articulate the human development in one set of issues. These reports are intended to assess the quality of life of population and be an advocacy tool for its improvement. The analysis draws upon data regarding health, education, nutrition, work, political freedoms, security, the environment and other aspects of people's lives. In assessing the population from a people-centred perspective these reports, have the political purpose of raising awareness and generating debate on public issues and concerns which would otherwise not be on political agenda.

National security and human security

The UNDP has developed a very broad understanding resting on the idea that security should not focus exclusively on states, territory and military questions as individuals are at the heart of the security concerns. In the traditional conception of security, the referent object is state. In the UNDP by contrast is individual.³¹ Human security does not ignore state security, but it treats it as no more than co-equal to individual security.³² Without human security, state security cannot be maintained and vice-versa. Human security challenges the traditional state-centric approach that the state is and (should be) primary object of security. Human security constitutes the purpose, while the state security constitutes the mean to achieve it.³³ The statist concepts of sovereignty and security began to creak with the Cold War, when the security agenda was shaped by the bipolar nuclear rivalry. The decolonization, the globalizing markets and, eventually, the end of the Cold War, moreover, marked the appearance of a new form of war. Rather than being fought between states and national armies, most contemporary armed conflicts take place within state boundaries, thereby challenging the traditional meaning of sovereignty. The dramatic death tolls of civilians, the persistence of poverty and diseases badly affecting human development and at times survival and the perception that nuclear risks had strongly diminished after the Cold War

³⁰ Alkire Sabina, "A Conceptual Framework for Human Security", Centre for Research on Inequality, Human Security and Ethnicity, CRISE, Working Paper 2 Queen Elizabeth House, University of Oxford, 2003 p.13
Human Development Report 1994, Published for United Nations, Oxford University Press, 1994
<http://hdr.undp.org/en/reports/global/hdr1994/chapters> (Accessed on April 20, 2015)

³¹ Kanti Bajpai, Kroc Institute Occasional Paper #19:OP:1, August 2000, p.21

³² Ibid., p.37

³³ Collins Alan, *Contemporary Security Studies*, Oxford Press University, UET Press 2009. p.132

were all factors that promoted a shift in thinking on security as the exclusive safety of state. The 1990s, with their hope and return to reality, thus witnessed an emergence of an idea of security which goes beyond the former statist outlook to be people-centered and not state-centered any more.³⁴ Human security means protecting fundamental freedoms It means protecting people from critical severe and pervasive widespread threats and situations. It means using processes that build on people's strengths and aspirations. It means creation political, social, environmental, economic, military and cultural systems that together give people the building blocks of survival.³⁵ Generally, the state, by not providing adequate protection or by repressing (some) of its citizens, like critical civil society groups or media, violates its basic functions of providing human security for its people.³⁶

The contrast between traditional national security and human security can be summarized in the following tables: Table 1. National Security and Human Security³⁷

	National (State) Security	Human (Individual) Security
Security from whom (referent object)	Primarily, the state	Primarily, the individual (people-centered)
Security of what values	Territorial integrity and national independence	Personal safety and individual freedom
Security from what threats	Direct threats from other states	Direct threats from state and non-state actors + indirect threats
Security by what means	<ul style="list-style-type: none"> • Force as the primary instrument of security, to be used unilaterally for a state's own safety • Balance of power is important; power is equated with military capabilities • Cooperation between states is tenuous beyond alliance relations • Norms and institutions of are limited value, particularity in the security/military 	<ul style="list-style-type: none"> • Force as a secondary instrument, to be used primarily for cosmopolitans ends and collectively; sanctions, human development, and humane governance as key instruments of individual-centered security • Balance of power is of limited utility; soft power increasingly important • Cooperation between

³⁴ Ladini Gianfabrizio, *The Idea of Human Security in International Relations: An Outline in History and Theory*, p.2

³⁵ *Security Studies An Introduction*, Edited by Paul D. Williams, Routledge 2008 p. 232

³⁶ *Transnational Terrorism, Organized Crime and Peace-building, Human Security in Western Balkans*, Edited by Wolfgang Benedek, Christopher Daase, Vojin Dimitrijevic' and Petrus van Duyne ,Palgrave McMillan 2010, p.3

³⁷ Bajbai Kanti, *Human Security: Concept and Measurement*, Kroc Institute Occasional Paper #19:OP:1, August Indiana 2000, p. 48

	sphere	states, international organizations and NGOs effective and sustained <ul style="list-style-type: none"> • Norms and institutions matter; democratization and representativeness in institutions enhance their effectiveness
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Table 2. Traditional vs. Human Security ³⁸

Type of security	Referent Object	Responsibility to protect	Possible threats
Traditional security	The state	The integrity of state	Intrastate war, nuclear proliferation, revolution...
Human security	The individual	The integrity of individual	Disease, poverty, natural disaster, violence, landmines, human rights abuses..

Human security is directly related to the concept of international peace and security. The report by the UN High-level Panel on Threats, Challenges and Change entitled A More Secure World: Our Shared Responsibility makes a distinction between threats from non-state actors and states to human security as well as state security.³⁹

Human Security Paradigm

The concept of human security has begun to develop as a new paradigm since the UN report 1994. Parallel with the growing political decision makers in this concept there is a growing number of states that have adapted these forms of this concept and have implemented it in their security policies such as Canada, Japan, that have inserted this concept as a integral part of their foreign policies. Norway, Switzerland and Sweden Austria invest many resources to promote the concept. The state began to redefine national security policies involving human dimension as their integral component after the end of Cold War. Human beings should be primary referent object of security, therefore international security studies should include issues like poverty,

³⁸ First published in Taylor Owen, "Challenges and Opportunities for Defining and Measuring Human Security," Disarmament Forum3 (June 2004): <http://www.taylorowen.com/Articles/Owen%20and%20Liotta%20-%20Why%20Human%20Security.pdf> (Accessed April 24,2015)

³⁹ Prezelj Iztok, *Challenges in Conceptualizing and providing Human Security* in HUMSEC Journal, Issue2 http://www.humsec.eu/cms/fileadmin/user_upload/humsec/Journal/Prezelj.pdf (Accessed on April 24, 2015)

underdevelopment, hunger and other assaults on human integrity and potential. Human security has academic presence across the West and Japan and has been embraced by United Nations (UN), European Union (EU), and Canadian, Norwegian and Japanese governments.⁴⁰ The referent object was shifted from nation-states to that of ‘people’, and to be ‘people-centred’ was to be ‘concerned with how people live and breathe in a society, how freely they exercise their many choices, how much access they have to market and social opportunities – and whether they live in conflict or in peace’ (UNDP, 1994: 23).

Human security means protecting vital freedoms. It implies the protection of people from critical and pervasive threats and situations. Therefore global justice is essential.⁴¹

Source: <http://3phumansecurity.org/site/cache/images/stories/520-human%20security%20chart>

	National security paradigm	Human security paradigm
Goal	Securing territory, economic and political interest of the nation such access to oil or other resources or promoting ideologies such as free market capitalism or democracy.	Protecting the well-being of individuals and communities so that they can live free from fear, free from want and free to live in dignity.
Actors	Primarily military	Multi-track effort at top, mid and community levels including the government, civil society, business, academic, religious, media and other actors
Analysis	The assessment primarily focus on terrorism, rogue states, and weapons of mass destruction (WMD)	The assessments include weapons of mass destruction terrorism from state and non-state actors, fragile states, poverty, economic disparity, discrimination between groups, armed non-state groups, deadly diseases, nuclear or biological materials, instability, environment destruction ..,
Budget	Security budget geared toward offensive military capacity	Security budget require investments in preventive

⁴⁰ Barry Buzan and Lene Hansen, *The evolution of International Security Studies*, Cambridge University Press, 2009, p. 36

⁴¹ Monica Den Boer & Jaap de Wilde (eds) *The Viability of Human Security*, Amsterdam University Press, 2008, p.

		efforts involving economic development, good governance, and robust, multi-track diplomacy
Global ties	Less relationship to global security	Greater relationship to global security

Two main schools of human security

All proponents of human security agree that the individual should be the focus of security. However, consensus breaks down over exactly which threats to the individual should be addressed as human security issues. Supporters of the narrow definition of human security argue for a focus on violent threats to individuals and communities. Supporters of the broad definition outlined in the 1994 HDR argue that hunger, disease, pollution, affronts to human dignity, threats to livelihoods, and other harms in addition to violence should all be considered human security issues. The two approaches are people-centred and are complementary rather than contradictory.⁴² The United Nations Development Programme first drew global attention to the concept in its 1994 *Human Development Report* (HDR). The report's broad definition of human security encompasses everything that constitutes freedom from want and freedom from fear.

Broad concept proponents UNDP, Kofi Annan, Wolfgang Benedek, Taylor Owen, Ramesh Thakur, Ferreira, Henk, Alire, Paris, and Jorge Nef. Canada defines human security as 'freedom from pervasive threats to people's rights, safety or lives, i.e. freedom from fear which is opposed to freedom from want, which corresponds to well-being rather security' (Axworthy, 1999:9). Canada has identified five policy priorities: protection of civilians, peace support operations, conflict prevention, governance and accountability, and public safety.⁴³ The Canadian government has furthermore provided funding for the Canadian Consortium on Human Security, 'an academic-based network promoting policy relevant research on human security', which since 2002 has published the Human Security Bulletin (www.humansecurity.info/ –last accessed 29 January 2008).⁴⁴

The original UNDP formulation opted for an expansion of security along several dimensions. The 'logic of security' should be broadened beyond territorial defense, national interests and nuclear deterrence to include 'universal concerns' and the prevention of conflicts, but also crucially a cooperative global effort to eradicate poverty and underdevelopment (UNDP, 1994: 22) These governments have linked Human Security with 'the pre-eminent progressive values of

⁴² <http://www.hsrgroup.org/press-room/human-security-backgroundunder.aspx>

⁴³ Monica Den Boer & Jaap de Wilde (eds.) *The Viability of Human Security*, Amsterdam University Press, 2008, p. 59

⁴⁴ Barry Buzan and Lene Hansen, *The evolution of International Security Studies*, Cambridge University Press, 2009, p.204

the 1990s: human rights, international humanitarian law, and socio-economic development based on equity' (Suhrke, 1999: 266).⁴⁵

In order to live a life in a security and dignity, people must be aware of fundamental rights and freedoms and they must be confident that their governments acknowledge and ensure these rights.⁴⁶ There are several related policy prescriptions aiming to measure and address human security. These include the following: Millennium Development Goals (MDGs) and Human Development Index (HDI) and Human Security Index (HIS)⁴⁷

International human rights law regulates the way states treat individuals under their control. The modern multilateral human rights regimes consists primarily of treaties regulating genocide (1951), racial discrimination (1969), civil and political rights (1976), economic, social and cultural rights (1976), discrimination against women (1981), torture (1987), and the rights of children (1990). Each party to these treaties promises other signatories to protect the human rights of individuals under its control. These treaties also create various monitoring mechanisms that aim to promote compliance.⁴⁸ Human security, coined by United Nations Development Programme (UNDP) to locate questions of poverty and health more firmly on the global security agenda.⁴⁹

European Union –Doctrine for European Human Security

A study group in 2004 for the European Security capacities led by Prof. Mary Kaldor, proposed a Doctrine for European Human Security, by reasoning that the EU has the need to use military force in new direction. The doctrine contains a narrow interpretation of human security focusing on freedom from fear which included seven principles. In 2007 the Madrid Report proposed the codification of 'a European way of Security' and the adaptation of the human security as a new action framework for EU foreign policy.⁵⁰ The EU approach to human security recognizes that "the main sources of political insecurity are either authoritarian states who repress their own citizens or a combination of state and non-state armed groups in conditions of state failure."⁵¹ The European Security Strategy lists five key threats to Europe: (1) terrorism, (2) the proliferation of weapons of mass destruction, (3) regional conflicts, (4) failing states, (5) organized crime. All these threats are interlinked and they can be found in different combinations situations in severe insecurity. As the European Security Strategy points out, 'none of the new threats is purely military; nor can be any tackled by purely military means'. These five key threats are not just

⁴⁵ Monica Den Boer & Jaap de Wilde(eds.) *The Viability of Human Security*, Amsterdam University Press, 2008.p. 24

⁴⁶ Wolfgang Benedek (Edited by) *Understanding Human Rights Manual on Human Rights Education*, , European Training and Research Center for Human Rights and Democracy (ECT) 3rd edition 2012, Graz p.5

⁴⁷ <http://3phumansecurity.org>

⁴⁸ Monica Den Boer & Jaap de Wilde, (eds.) *The Viability of Human Security*, Amsterdam University Press, 2008. p. 107

⁴⁹ Barry Buzan and Lene Hansen, *The evolution of International Security Studies*, Cambridge University Press, 2009, p.128

⁵⁰ *European and Security Affairs*, No -26, Monthly Journal of Security Issues, Institute for Democracy and Mediation, Tirana, 2013, p.111

⁵¹ *Ibid.*, p.113

threats to Europe; they are global threats.⁵² The Western European Union described a common concept of security environment that highlights, among other things, the importance of the maintenance of international peace and the widest possible observance of generally recognized norms of conduct between states and of democratic institutions, respect for human rights and fundamental freedoms, and the rule of law.⁵³ While UN related diplomatic initiatives promoted human security as a concept, with its policy implications left ambiguous, open to interpretation, they do not go as far as proposing human security as a “doctrine” for international security policy. However the Study Group on Europe’s Security Capabilities, known as Barcelona Group (independent group created by the EU than High Representative Javier Solana) proposed human security as a doctrine for European security policy. This initiative build on the new European Security Strategy adapted by the European Council in 2003 that identifies terrorism ,proliferation of weapons of mass destruction, regional conflicts, state failure and organized crime as a key threats facing Europe. The Barcelona’s Group 2004 report articulates a doctrine, especially concerned with the humanitarian emergencies and human rights crises related to these threats.⁵⁴ For the Barcelona Group, “Human security refers to freedom for individuals from basic insecurities caused by gross human rights violation.” The doctrine proposes : (i) seven principles: the primacy of human rights, clear political authority, multilateralism, a bottom-up approach: on communication, consultation, dialogue and partnership with local population in order to improve early warning, intelligence gathering, mobilization of local support, implementation and sustainability; (ii) a ‘Human Security Response Force’, composed of 15,000 men and women, of whom at least one third would be civilian (police, human rights monitors, development and humanitarian specialist, administrators, ect.) (iii) a new legal framework to govern both the decision to intervene and operations on the ground. This would be on the domestic law of host states, the domestic law of sending states, international criminal law, international human rights law and international humanitarian law.⁵⁵ The EU seeks to implement the concept of human security in through its continuous obligations to a legal framework. All EU states have signed a number of legally binding human rights treaties in particular European Convention on Human Rights and Fundamental Freedoms. All EU states are thus obliged to promote, secure and protect human rights and thereby human security of its citizens. ⁵⁶ As long as people outside the EU are exposed to insecurity issues, the EU itself cannot be safe. External insecurity will ultimately affect European democratic values and institutions. Hence insecurity penetrates national borders and is exportable and importable across the geographical domains.⁵⁷ Many governments across the world now refer to human security concept in their foreign policies statements. Fifteen countries are member of the Human Security Network “a group of

⁵² The Barcelona Report of the Study Group on Europe’s Security Capabilities, *A Human Security Doctrine for Europe*, 2004, p.3 <http://eprints.lse.ac.uk/40209> , <http://www.globalgovernancewatch.org/resoucers.a-human-security-doctrine-for-europe>.

⁵³ Monica Den Boer & Jaap de Wilde (eds.) *The Viability of Human Security*, Amsterdam University Press, 2008.p. 59

⁵⁴ Parr-Fukuda Sakiko and Messineo Carol, *Human Security: A critical review of literature* Working Paper No.11, Centre for Research on Peace and Development, Leuven, Belgium, January 2012, www.inexproject.eu p. 10-11

⁵⁵ Ibid.,p.11

⁵⁶ http://dochas.ie/sites/default/files/hs_briefing05.pdf

⁵⁷ Inger Helene Sira and Jonas Gräns, *The promotion of Human Security in EU Security Policies*, Inex policy Brief, No.7 March 2009, p. 5 www.inexproject.eu

like-minded countries from all region of the world that ...maintains dialogue on questions pertaining human security.⁵⁸

Balkans states and human security perspective for their development

The Balkans and especially the conflicts around the disintegration of the former Republic of Yugoslavia (FRY) became a landmark crisis of the immediate post-Cold War period.⁵⁹ There is a significant connection between the human rights approach and that of human development and capability. As stated on Human Development Report 2000 Human rights and human development share a common vision and a common purpose – to secure the freedom, well-being, and dignity of all people anywhere. UNDP 2000, p.1⁶⁰ There is a direct relationship between security and poverty. It is evident that poverty destabilizes societies to a large extent and has been one of the major problems of the twentieth century and still is a serious problem in world different regions including the Balkans. Poverty deprives human beings from dignity and is a crucial factor for creation of social tension, which is in some cases, can take the extreme forms of terrorism, illegal activities, ect...⁶¹ Global challenges have to be assessed in terms of how they affect the safely of people, and not just of states.⁶² The Balkan countries are characterized by weak states. State fragility causes different security threats at different levels. At the global level, the post 9/ 11 discourse links state failure to various kinds of immediate threats to international peace and stability. In a similar manner, the European Security Strategy, adopted by the EU heads of state in December 2003, identified state failure as one of five key threats to European security⁶³.

In the relationship between globalization and human security there is more or less general agreement that the forces of economic globalization are transforming international politics and recasting relationships between states and peoples with important implications for human security: globalization is not only intensifying trade and economic connections, but also accelerating the pace of economic and social change. Further, it is not just goods and capitals that are exchanged across borders, but ideas information and people.⁶⁴ Macro-oriented studies of the globalization-human security nexus should be complemented by case studies of specific countries or globalization processes.⁶⁵ The impact of failed states on the region can be generally divided into military, social and economic factors. The negative impact of fragile state on development is unequivocal. At a local level vulnerable groups within fragile states will suffer from a decline of human security, defined as a protection of people from critical (severe) and pervasive (widespread) threats and situations. Taking the core indications of Millennium

⁵⁸ http://www.dochas.ie/sites/default/files/Human_Security_note.pdf

⁵⁹ Barry Buzan and Lene Hansen, *The evolution of International Security Studies*, Cambridge University Press, 2009, p.180

⁶⁰ Séverine Deneulin with Lila Shahani (Edited) by *An Introduction to the Human Development and Capability Approach Freedom and Agency*, Earthscsan Published in UK and USA in 2009 , p.59

⁶¹ Antonios Rovolis, Assistant Professor Horokopio University, *Poverty and Security, a complex nexus : the case of Balkans* p.1

⁶² *Security Studies An Introduction*, Edited by Paul D. Williams, Routledge 2008 p.232

⁶³ Daniel Lambach and Tobias Debiel, *State failure and state building* p. 163-165

⁶⁴ Ibid.p.233

⁶⁵ Ibid. p.235

Development Goals as a guide line, research has consistently shown that human security is widespread within fragile states. Hence, there should be a joint interest in developed and developing countries alike to prevent state failure or to alleviate its repercussions.⁶⁶

In every state, the government balances a concern for well-being of persons under its control with concern for security (internal and external) and the government's own perpetuation. The degree of reconciliation of governmental authority with individual rights depends on a number of factors, including economic development; social, religious, and political culture; and the presence or absence of internal or external armed conflicts.⁶⁷

Nowadays, human security conception is well known and is still being developed by Western European Countries (mainly the EU members), the United States, Canada, Japan and the Third World. From this point of view what is the position of the former communist countries in the South and Eastern Europe on this matter. Taking into consideration the fact that it is possible to select Canadian so called (freedom from fear) and Japanese (freedom from want) school of human security, it is possible to state the mentioned region is an object of interest- the crossroads between these two approaches. The future will show which concept will be adopted.⁶⁸

As far as human security in post- communist countries is concerned, the case of Slovenia is exceptional due to the participation of that country in Human Security Network initiative as the only former communist country.⁶⁹ The former communist countries in South and Eastern Europe today are strongly interested in human security policy and, on the other hand the human security leader such as Canada and Japan are interested in this region. The reason why this situation takes place is a *soft power* of the human security concept. Moreover, new democracies, due to their membership in the EU/NATO tend to search for the best solution for their national security strategies. Thus, it could be stated at this time the process of the conceptualization of the human security in the Balkans could be observed.⁷⁰ Since the early 1990s the political situation in the former communist countries in that region has been transforming into: democratic system of the governance, civil control over armed forces, economic reforms and protection of human rights. Moreover, the new security strategies in these countries are related to new security thinking (broad security concept). Thus, it is possible to state that the development in Western countries human security theory affects the national security policy of the states. Which school of human security, Canadian or Japanese, will new democracies choose? The Kosova conflict, the situation in Bosnia and Herzegovina – the necessity of humanitarian support of the international community- could lead to conclusion that these countries will accept human security concept (*freedom from fear*). On the other hand, it seems that Canadian approach is developed in Serbia as well. For example the Belgrade School of Security Studies was established, in cooperation with Norwegian and Canadian authorities. The school focuses on

⁶⁶ Daniel Lambach and Tobias Debiel, *State failure and state building* p.165

⁶⁷ Jack L. Goldsmith, Eric A. Posner, *The Limits of International Law*, Oxford University Press, 2005 , p.109

⁶⁸ Karina Paulina Marczyk, Original Paper,UCD 327,5 (497) *A conceptualization of the Human Security Doctrine in the Post Communist States in Balkans*, in Croatian International Relations Review, January-June 2007 p. 39-40

⁶⁹ Ibid., p.40

⁷⁰ Ibid., p.42

humanitarian intervention issues. The humanitarian intervention doctrine is being developed in Macedonia. An exception is Slovenia. The country, being the only one from the former communist states, is an active member of Human Security Network. In the context of human security is that Slovenia could be more interested in Japanese (freedom from want) school of human security. Japan is strongly exploring the Slovenian case, especially in the context of economic affairs. Another Balkan country which is mainly interested in social aspects of human security is Albania.⁷¹ The table shows preferred approaches to the human security concept in the selected Balkan countries.⁷²

Country	Preferred approach to the human security concept
Albania	Japanese (freedom from want)
Bosnia and Herzegovina	Canadian (freedom from fear)
Kosova	Canadian (freedom from fear)
Macedonia	Canadian (freedom from fear)
Montenegro	Canadian (freedom from fear)
Serbia	Canadian (freedom from fear)
Slovenia	Japanese (freedom from want)

The lesson learned is that Balkan countries are mainly interested in the *freedom from fear* approach to human security concept. It seems that the reason is unstable political situation in former Yugoslavia, except for Slovenia and Croatia. On the other hand, the tough economic situation in these countries will probably force them to develop Japanese concept as well. The future will show the results. Both concepts freedom from fear and freedom for want are important.⁷³

Regarding the Western Balkan security Buzan identifies two main periods that determine the developments in this region: The first period is from 1990 to 1999 and Kosova war and the second period is the development of Western Balkans from 1999 until today. He emphasizes that during the first period the Western Balkans can be defined as a security complex, while during the second period after 1999 is in large quantity a security sub complex because of development of the events has been mainly framed in European level, than inside the region.⁷⁴

The geopolitical position of Western Balkans the region has been a source of wars, crises and ethnic conflicts. Human security problem in the Western Balkans can be summarized as follow: Problems of organized crime (threats national, regional and human security), corruption, terrorism, peace-building process, vulnerable groups, poor social and economic conditions-unemployment, human rights problems such as ethnic cleansing ,displacement, refugees,

⁷¹ Karina Paulina Marczuck, Original Paper,UCD 327,5 (497) *A conceptualization of the Human Security Doctrine in the Post Communist States in Balkans*, in Croatian International Relations Review, January-June 2007 p. 44

⁷² Ibid., p.43

⁷³ Ibid., p. 44

⁷⁴ *European and Security Affairs*, No -25, Monthly Journal of Security Issues, Institute for Democracy and Mediation, Tirana,2013 p. 21

violation of humanitarian law-(crimes against humanity ,genocide), discrimination of women, ethnic discrimination, freedom of expression. These are some of the non-traditional security threats not only for states but also for individuals, threatening their human security by being victims of these threats.

According to a special report commissioned by the UNDP concerning the issues of human security in the Balkans, it is argued that human insecurity in the region is best explained and confronted from the perspective of a weak state.⁷⁵ Ethnic and religious violence against minorities has been a consisted problem in the Western Balkans. The discrimination to other groups in the society including Roma represents another problem for human and community security as well.⁷⁶ According to Elke Krahman argues that new security threats do not target states, but societies and individuals. After communism collapse the liberalization accompanied by political and economical vacuum of the institutions and the number of conflicts and wars in the Balkans region led to the impoverishment of the population. These factors also created a fertile group for growth and spread of non-traditional security issues.⁷⁷ Economic security in Balkans is not ensured yet, in many Balkan states rapid economical reforms (mostly problematic), instabilities in political and social life, low scale of investments, high unemployment rate and even the percentage of the population that live in the poverty thresholds (with 1-2 euro) remain disturbing matters.⁷⁸ Often economic insecurity has to deal with the lack of the democratic rights and freedoms.⁷⁹ According to an overview of poverty in the Western Balkans, UNDP Early Warning Reports and different surveys indicate that at least one half of the population perceives their financial position as unsatisfactory or mostly unsatisfactory: In Bosnia and Herzegovina the majority of the population considers themselves poor, in Serbia close to one half, in Montenegro and Croatia as much as 80%, Albania 90%, FYR Macedonia 28.7% declare that their monthly income is insufficient to meet their needs, with an additional 40.7% declaring that it mostly does not meet their needs. Namely, 'absolute poverty [...] in almost all of the Western Balkans is still relatively high, and is not showing significant tendencies of decreasing. A large concentration [...] just above the poverty line additionally demonstrates the challenges faced by the entire region'.⁸⁰ According to Center for Strategic and International Studies CSIS-EKEM Policy Report Considerable people in the region live below the poverty line. Albania and Bosnia-Herzegovina have the highest percentage of people living in poverty. A larger number of West Balkan is living in poverty and vulnerable to falling to fall the poverty line- youth, women, and the elderly being the most vulnerable. Unemployment and lack of education are primary

⁷⁵ Bülent Sarper Ağır, *Rethinking Security in the Balkans: The Concept of Weak State and its Implications for Regional Security*, SDU Faculty of Arts and Sciences Journal of Social Sciences Special Issue on Balkans, p.4

⁷⁶ *Assessing Human Security in the Western Balkans*, CSIS-EKEM Policy Report, Center for Strategic and International Studies p.2

⁷⁷ Bülent Sarper Ağır, *Rethinking Security in the Balkans: The Concept of Weak State and its Implications for Regional Security*, SDU Faculty of Arts and Sciences Journal of Social Sciences Special Issue on Balkans, p.1

⁷⁸ *European and Security Affairs, No-2*, Monthly Journal of Security Issues, Institute for Democracy and Mediation, Tirana, 2006 p. 83

⁷⁹ Sen Amartya, *Development as freedom*, Publishing House Dudaj, Tirane, 2009 p.36

⁸⁰ Wolfgang Benedek, Christopher Daase, Vojin Dimitrijevic' and Petrus van Duyne, *Transnational Terrorism, Organized Crime and Peace-building, Human Security in Western Balkans*, Palgrave MacMillan 2010, p.31-32

causes of poverty.⁸¹ Threats from terrorism and organized crime are often considered a major concern of states in the Western Balkan region. The violence that accompanied the processes of state creation has had major implications for state-building and the solidification of state structures.⁸² Organized crime, and terrorism cross-cut all three main dimensions of human security: violence, human development and human rights. Hence, human security is an appropriate framework to address these problems. For example, if the police, the judiciary, or the administration of a state does not function properly, this creates a problem of personal security. If crime is not prevented and criminals are not held accountable, the state does not fulfill its basic functions.⁸³

Post-conflict situations are often characterized by weak states, states that need to consolidate and to rebuild their state functions. In the context of the post-conflict situation in the Balkans this means that the root causes of the conflicts, like ethno-national aspirations as well as discriminatory situations, need to be taken into account together with ongoing problems of treatment of minorities and other ethnic groups. The security of the human person and the security of the state are thus related. By providing for the rule of law, good governance, pluralist democracy, freedom of expression and of the media, and public accountability, the state creates the framework conditions for human security as personal security and beyond.⁸⁴

The problem of organized crime in the Balkans knows no borders and has no limitations to ethnic, nationalistic or any other obstacle for joint action. Exploiting chaos, insecurity, lack of proper organization and nonexistence of the rule of law, organized crime networks have established their stronghold in the region and created links to the high-ranked officials and parts of military establishments. Organized crime's structures are interlinked with state apparatus and present a real threat not only for individuals, but for the state. Criminal gangs attached to political elites in the various states threaten their transformation, their democratization and the process of the integration into Euro-Atlantic structures. It is claimed that organized crime is still often linked with (persons in) state institutions and that because of the nature of weak states in the Balkans. The fight against organized crimes faces many problems such as the reluctance of the local organs to deal with the criminal structures and involvement by the political elite in illegal activities. In most countries of the region the corruption is endemic, systematic and well organized, and has taken the root in state institutions of power, including the judiciary, police and secret service. Terrorism may easily find fertile soil in national and ethnic conflicts, as well as in consequences of the recently ended wars.⁸⁵ Small arms and light weapons also represent a threat to region security. Demographic dynamics and population movements have important ramifications for human security. Serious human security concerns persist in the form of displaced persons facing poverty, unemployment and limited access to such social

⁸¹ *Assessing Human Security in the Western Balkans*, CSIS-EKEM Policy Report, Center for Strategic and International Studies p.3-4

⁸² Wolfgang Benedek, Christopher Daase, Vojin Dimitrijevic' and Petrus van Duyne *Transnational Terrorism, Organized Crime and Peace-building, Human Security in Western Balkans*, Palgrave MacMillan 2010, p.8

⁸³ *Ibid.*, p.20

⁸⁴ *Ibid.*, p.13

⁸⁵ Bülent Sarper Ağır, *Rethinking Security in the Balkans: The Concept of Weak State and its Implications for Regional Security*, SDU Faculty of Arts and Sciences Journal of Social Sciences Special Issue on Balkans, p.7-8

benefits as education, justice and freedom of movement. Therefore, the forced migration of refugees and Internally Displaced Person (IDPs) are severe destabilizing factors for the Balkan region. Connected to demographic security of the region, human trafficking is another non-traditional security issue.⁸⁶ Environmental changes can threaten global, national, and human security. Environmental issues include land degradation, climate change, water quality and quantity, and the management and distribution of natural-resource assets (such as oil, forests, and minerals). These factors can contribute directly to conflict, or can be linked to conflict, by exacerbating other causes such as poverty, migration, small arms, and infectious diseases.⁸⁷

Air and water quality, waste management, recycling and nature protection are among the areas of concern in Southeast Europe. The main challenge is the lack of government action when it comes to aligning environmental laws with European standards, as well as the lack of administrative capacity and technology. Also climate change has been an issue of concern in Western Balkans.⁸⁸

Conclusions

The main aim of human security is to protect human beings and their rights. International security is interconnected and the human security is a universal concern regardless their nationality. Human security is closely related to human development and to the protection of human rights. Human security is a concern about human live and dignity. The Western Balkan countries face a wide range of human security challenges. These challenges require strengthening of the state and non-state actors dealing with the people's main problems. Regional cooperation and joint-security measures is important as Western Balkan states which share similar human security challenges. Strengthening state institutions and the political will to respect human rights are core elements for enhancing human security in the region. Human security threats are interconnected with the fragile political developments, social and economical concerns, and the lack of the belief among the ethnic communities, tendencies for religious extremism, organized crime and presence of a great amount of munitions in these countries that can be utilized by extremist group. The poor social and economic conditions and the breach of human rights, issues regarding to respect for minority rights as self-government rights, cultural rights and political representations, religious and nationalist extremism are the most important threats of Western Balkans security and human security as well can cause violence and can jeopardize the stability and security in the region and Europe.

The human security approach can be useful in Balkan countries development. Despite of the positive developments in regional cooperation between Balkan states there are still security challenges that should be addressed including the human security challenges in respective states. The fight again organized crime is a challenge for human security and Balkan states as well. There is a big dilemma to include human security in states security policies. Regional

⁸⁶ Ibid.,p10

⁸⁷ <http://www.worldwatch.org/node/569> *World Watch Magazine*, January-February 2005, Volume 18, No.1

⁸⁸ *Assessing Human Security in the Western Balkans*, CSIS-EKEM Policy Report, Center for Strategic and International Studies (CSIS) and Hellenic Centre for European Studies (EKEM)p.5

cooperation in terms of human security is needed to improve the people's situation in these countries since they face similar human security problems. The human security approach can be useful and affective mean to deal with problems of the people in Balkan countries development. As the UE has adapted human security approach in its policies the Balkan countries may choose one school of human security as a priority or a combination of both human security schools for their further political, economical and social development. Human security threats at the same time represent threat to regional security and global security as well. Regarding the regional security and stability in Balkans there are still hot spots like in Bosnia and Herzegovina, Mitrovica (Northern Kosova) the problems of the Albanians in Preshevë, Bujanoc and Medvegje but also the ethnic problems in Macedonia and when dealing with problems human security dimension should be a key priority of the security policies. It is not an easy task to deal with all these problems from human security perspective. It requires regional cooperation and concrete initiatives. They may set as a cooperation priority the further development of their citizens in terms of human security. Development and human security are big challenges for the Balkan region especially when taking into account the pace of these countries are advancing toward Euro-Atlantic integration.

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Systematic Approach of a Knowledge Based Society

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ABSTRACT

The goal of this paper is to stress the importance of targeted creation and exploiting of synergistic effect of different social structures and processes. By using specific and targeted synergy improved by entrepreneurship activity, endless possibilities of economic growth and development will arise.

All the while a qualitative method of research is used – analysis of secondary databases as well as an overview and critical review of recent theoretical discussions.

The mankind developed and survived thanks to its primarily engrained need to organise and connect. We are all part of a system, an organisation interconnected by multidimensional reversible connections of cause and effect interdependency. By having a synergy of social creations, a man creates a reality which an individual can only contemplate about.

Triple Helix concept is based on the systematic approach to thinking and acting and uses all its advantages.

Within the Triple Helix concept, the three concepts of the three wholes (university, industry, government) are connected by multidimensional interdependency connections creating a “stem cell” space, a unique space of their dependency. The space interwoven with the connections of the three elements of Triple Helix (university, industry, government) framed within the Knowledge Space, Innovation Space and Consensus Space. The mentioned spaces of interaction of university, industry and government are founded on the basis of knowledge, innovation, leadership and governance which represent the base for their interaction.

Innovation is moving force of changes and a necessary prerequisite of survival in today's changeable knowledge based society. A society being built, developed and changed on the foundations of knowledge as its starting point has a knowledge-based innovation from which it arises and in which it continues. For an idea to come to life and get a clear form within a socially acceptable and beneficial innovation, it is necessary to have commercial direction and market leadership, i.e. entrepreneurship knowledge and skills. Entrepreneurship represents the link between innovation and market, it gives the innovation its purpose and usefulness. An innovation enriched by an entrepreneurship activity becomes the foundation and moving force of knowledge society.

Mentioned trends necessary have to be recognised and encouraged through government regulatives, without its guiding and leadership they merely stay theoretical courses without the possibility of practical implication.

This, once more, confirms the importance of the claim, acknowledged long time ago, about the interdependency of seemingly disconnected systems and presence of their mutual relations which pervade, connect and drive us. By accepting the fact that we are the subsections of interdependable whole, we can use unlimited advantages of synergy effect of collectiveness hence ensuring the necessary economic growth.

Key words: systematic approach, Triple Helix concept, knowledge society, innovation, entrepreneurship

Systematic approach

The mankind has evolved and survived owing to its innate need to organise and connect. If we think for a moment we will see that all of us make a part of a system, organisations connected with multidimensional interdependence of cause and effect. The organism itself of a man is made out of numerous small systems, physiological systems which are connected with strong links of interdependence and allow functioning of man's organism, a big system summarizing them and giving them meaning, which is however meaningless and impossible without them. Man as system per se could not survive in a world of couples/pairs and systems. He needs a pair because of its social and physiological survival and development. He requires sources of energy that are renewed and sustained in the meanwhile. He requires other living beings, animals and plants, for food and preservation of ecosystem which surrounds us and includes. He needs other planets and galaxies that make the Earth harmonious source of life (Senge, 2009).

The entire universe is a large open whole made of series of systems and their mutual relationships which permeate, connect and move us (Senge, 2009, p. 232).

Bohm (1965 cited in Senge, 2009, p. 232), a leading theorist of quantum theory, says: "Quantum theory implicates that the universe is a undivided whole, even though in macroscopic dimensions it can seem as if it were divided into parts which exist separately."

Systems approach is not a new way of considering reality. This way of contemplating is as ancient as philosophy itself. It appeared when the Greeks found the way to render the mystic and invincible cosmos perceivable. At that time Aristotle laid the foundation of systems way of thinking by saying: "The whole is more than the sum of its parts" (Bertalanffy, 1972, pp. 407-426). In 1936 Ludwig von Bertalanffy developed the General Systems Theory which he based on the hypothesis of a system as a set of interactions of separate parts with a clear assumption of nonlinearity of these interactions. According to him, nothing can be observed in isolation but only as a part of a set of interdependencies of nonlinear interactions. Bertalanffy's work was continued by Ross Ashby. Later this theory became the basis of a Gaia hypothesis about the Earth as a living organism, a unit made of other units.

Individuals are often enclosed in their mindsets the limit of which are firm and where there are linear cause-effect relationships rather than multidimensional and multi-simultaneous. We even most frequently learn through method of trial and error, where the trial and the error are seen in simple, linear connection. Otherwise we would not notice them nor would we learn anything. In such closed conceptual models, of which we do not want to be aware, we are unable to perceive, construct or alter systems reality of multiple feedbacks. Thus we are unable to truly act, both in terms of business and private life (Senge, 2009).

By opening ourselves to systems thought and truly understanding that we are but a subunit of interdependent units, we can use the unlimited benefits of shared thought and action.

Triple Helix concept

The concept of Triple Helix is based on systems thought approach to reflecting and acting, and uses its advantages.

Within the Triple Helix concept, the three units: university, industry and government are interconnected with multidimensional ties of interdependence and make a „stem cell“ space, a unique space of their dependence. The space permeated with ties of the Triple Helix elements framed inside Knowledge Space, Innovation Space and Consensus Space (Ranga, 2011). With the cooperation of university, industry and government inside the Knowledge Space it is easier to arrive to the existing knowledge of participants of the Triple Helix, the synthesis of which represents a suitable basis for building new knowledge. The Consensus Space represents the framework of the Triple Helix, „the meeting point“ of the university, industry and government, which is suitable for generating new ideas and synergetic strategies. Within hybrid structures of incubators, science parks, „company” universities etc. that are accumulated within the Innovation Space of the Triple Helix, innovation is created as a basic stimulus and building block of all activities (Etzkowitz, 2011).

The stated spaces of interaction of the university, industry, government are built on the basis of knowledge, innovation, governance, leadership (Etzkowitz, 2011).

Even though the usefulness and necessity of interaction between university, industry and government is logical and natural, almost intuitive, it was not until 1970s that the need for interaction between industry and science was noted. The need arose as a consequence of technological innovations which positioned agricultural production in the background of national economies, and gave up the leading position to the industrial manufacturing and technology-intensive services (Ranga, 2011).

Transition from the post-industrial to the today's Knowledge Society brings increasing importance of 'knowledge' in innovation, economic growth and competition (Ranga, 2011).

Innovation as the basis of Triple Helix concept and the moving force of knowledge based society

Mankind is in the process of infinite transition, continuously striving to better, different, or at least more acceptable solutions (Samuelson and Nordhaus, 2011, p. 501). The famous historian Hobsbawm in his work *The Age of Revolution* (1962), by studying the past and its causal influence to the present and future, concluded that the industrial revolution had not been an episode with the beginning and end but is still going on (Samuelson and Nordhaus, 2011, p. 501). An intangible and immeasurable idea which is based on knowledge and creativity of individuals, who are unable to express themselves in terms of quantity, is the only permanent foothold of today's knowledge-based society (Drucker, 1985).

Encouraging and stimulating innovation is one of the main objectives of European policies. Innovation forms part of the Europe 2020 strategy (the EU's growth strategy) for its role in creating job opportunities, making enterprises more competitive in the global market, improving the quality of life and in contributing to a more sustainable growth. Research and innovation is one of five key targets covered by the Europe 2020 strategy. The other four are employment, education, social inclusion and poverty reduction, and climate/energy. Furthermore, the Europe

2020 strategy includes a guideline to optimise support for R & D and innovation, strengthening the knowledge triangle between research, innovation and education (Eurostat, 2015).

That is where the Triple Helix concept and the consequent concept entrepreneurial university are imposed as a possible adequate solution connecting industry, university and government with the links of innovation, knowledge, governance and leadership. From their interference arises socially useful innovation which changes and develops knowledge society, and with quantitative indicators manifests itself through entrepreneurship and economic growth.

Innovation is a stimulus to change and a necessary prerequisite for survival in the modern, knowledge-based society, which is prone to change. The society that is constantly built upon, which develops and modifies based on knowledge has knowledge-based innovation as its stronghold, from which it derives and which it uses for its development (Drucker, 1985).

According to Drucker, every knowledge-based innovation requires three preconditions to be fulfilled which create a “natural environment” for its growth (Drucker, 1985, pp. 115-120). The first precondition is a thorough analysis of all factors necessary for the realisation of innovation, both economic, social and psychographic as well as new knowledge and further inventions. By conducting a thorough analysis we can note the flaws of individual factors crucial for the implementation of innovation and construct them, model them according to needs in order to be successfully interpolated in the innovation.

That is how Joseph Pulitzer, through thorough analysis of factors necessary for the realisation of his modern newspaper, noted a lack of massive marketing which could make the editorial independence and commercialisation of the idea possible. However, he was not the first to create the concept of modern newspaper. The first person to create newspaper in the modern sense of the word was James Gordon Bennett. He based his idea on technological discoveries of telegraph and high-speed printing.

He anticipated the need for financial independence of newspapers in order for freedom of speech to be fully established, realising at the same time the necessity of reasonable price which allows their mass availability.

Despite realising numerous possibilities and noting necessary factors, Bennett did not perform their further analysis and innovative upgrade. He failed to develop elements that would ensure financial independence and broad availability of this revolutionary idea, even though he saw the need for them. That is the reason why his idea was not realised to the fullest. Only after two decades Joseph Pulitzer, through detailed analysis of crucial factors, gave the idea of modern newspaper necessary elements of mass marketing and achieved what Bennett in his creative activity wanted to achieve.

The second element necessary for realisation of a knowledge-based idea is entrepreneurial management. The entrepreneurial spirit driven by strong market orientation is not always a familiar notion for innovators in the field of high technology and other knowledge-based innovations. Innovators are generally intolerant of anything which is not scientifically based and which does not come from the sphere of their activity. They frequently think that quality is measured through technical sophistication rather than through applicability and value offered to the customer (Drucker, 1985, p. 119). By completely forgetting the market focus and usability of their idea to the customer, they remain unable to realise and commercialize their ideas.

The third precondition necessary for the realisation of a knowledge-based idea is a clear focus which is connected with market focus, strategy of idea realisation and taking a strategic position in the market. Without market focus the requirements of which the idea has to meet and a clear strategy on market performance, the most revolutionary and innovative idea cannot be realised. The power of fulfilling the precondition of clear focus is visible in Edison's success (Drucker, 1985, p. 118). In his work, Edison did not focus solely on technical features of his innovation. Even before he started technical research he dealt with commercialisation and realisation of his technically incomplete idea. In this way he noted and fulfilled the need to implement his idea within production process executed by a electric power company, ensuring distribution and commercialisation of his idea and surpassing Swan who struggled with the commercialisation of his already completed invention.

We see that for the idea to come to life and be clearly formed in a socially acceptable and useful innovation, a synthesis of science and industry complemented with entrepreneurial knowledge is necessary which can find support within the structures of the entrepreneurial university.

Entrepreneurial university

Knowledge society brings increasing role of university in the 'learning economy'. University appears as equal partner to industry and government. Moreover, it is taking lead role (Ranga, 2011).

For years the mission of university was to educate and perform basic research, while industry aimed at solving issues. However, the global trends are changing the traditional role of university. In a present turbulent environment, university and industry together form creative and entrepreneurial atmosphere suitable for research aimed at problem-solving and commercialisation of intellectual property of university (HAMAG BICRO, 2010, p. 67). Universities become the backbone of industry and science.

In such conditions a university gets a new meaning and a new role expressed within the concept entrepreneurial university.

Entrepreneurial university is a cradle of polyvalent knowledge which unites theoretical and practical factors of innovation and provides a commercial support to the idea from which it is derived (Etzkowitz, 2002, pp. 16-18). Therefore it is not unusual that the entrepreneurial university occupies a crucial position in the knowledge-based society, representing a source of researchers of practice and professors of practice who skilfully summarise and complete the areas of knowledge, creativity, innovation and their commercialisation (Etzkowitz, 2011).

The concept entrepreneurial university, with its characteristics, represents the needed incentive environment for creating and commercialisation of innovation based on knowledge which will stimulate the growth of business sector as well as economic growth. Therefore one of the most important goals of the national innovation system, the first step of an efficient use of the concept of entrepreneurial university for realization of the required growth should be harmonization of higher education system with economic policy objectives and the needs of industry and utilization of benefits of their synergy (HAMAG BICRO, 2010, 71).

This synergy can be concretized through the government determination of quotas for all higher education institutions. The government's proposals should be led by analyses and projections done by the National Competitiveness Council, regional Agencies for development and

Employment Services. This would reduce unproductive activity of our experts and improve national competitiveness which is necessarily linked to productivity (GCFChannel, 2011). With the same goal in mind, the government should also make decisions on granting scholarships to a certain profile of students in accordance with mentioned analyses and projections. At the beginning of implementation of entrepreneurial activity within universities, the government should assume a significant role in providing financial support to projects created as a result of cooperation between universities and entrepreneurs. By using the necessary elements of executive and legislative, it should also create the conditions for the establishment of enterprises within universities in which external and internal participants would cooperate as equals, connected by a common goal of their action which is profit.

By organising and stimulating research activity within the framework of colleges, which requires the support and active participation of the government, we can build and change our knowledge-based society through knowledge-based innovation. In this way we will find a firm foothold during the instabilities of transition and provide a ready answer to all changes.

Government

The government assumes an important governance role in the Triple Helix synergy by stimulating, supporting and carrying out research activity. But we notice slow reform in the government institutional sphere due to Triple Helix demands.

According to Eurostat research (2008, p. 46) which was conducted during 2002/ 2004, the government sector made up only 13% of total R&D personnel in the EU-27. The leading position in the employment of R&D personnel was occupied by business enterprise sector, accumulating 44% of all personnel employed in R&D. An analysis of R & D personnel in the EU-28 by institutional sector in 2012 also shows that there was a high concentration of researchers in the business enterprise sector (46%) and the higher education sector (40%), while only 12% of the total number of researchers were working in the government sector (Eurostat, 2015).

During 2007 and 2012 business enterprise sector also occupied the leading position in the gross domestic expenditure on R&D (Eurostat, 2015).

Table 1

Gross domestic expenditure on R&D by sector, 2007 and 2012 (% of GDP)

	Business enterprise sector		Government sector		Higher education sector	
	2007	2012	2007	2012	2007	2012
EU-28	1.17	1.30	0.24	0.26	0.41	0.49
Euro area (EA-17)	1.20	1.35	0.26	0.29	0.40	0.48
Belgium	1.32	1.52	0.15	0.18	0.40	0.52
Bulgaria	0.14	0.39	0.27	0.19	0.04	0.03
Czech Republic	0.80	1.01	0.31	0.35	0.25	0.52
Denmark	1.80	1.96	0.08	0.07	0.68	0.95
Germany ⁽¹⁾	1.77	1.95	0.35	0.43	0.41	0.53
Estonia	0.51	1.25	0.09	0.20	0.45	0.70
Ireland	0.85	1.20	0.09	0.08	0.35	0.45
Greece ⁽²⁾	0.17	0.24	0.13	0.17	0.30	0.28
Spain ⁽³⁾	0.71	0.69	0.22	0.25	0.33	0.36
France ⁽⁴⁾	1.31	1.45	0.34	0.31	0.41	0.47
Croatia	0.33	0.34	0.20	0.21	0.27	0.20
Italy	0.61	0.69	0.17	0.17	0.35	0.36
Cyprus	0.10	0.06	0.11	0.08	0.20	0.26
Latvia	0.19	0.15	0.14	0.18	0.26	0.33
Lithuania	0.23	0.24	0.17	0.18	0.41	0.48
Luxembourg ⁽⁵⁾⁽⁶⁾	1.32	1.00	0.21	0.30	0.05	0.19
Hungary ⁽⁷⁾	0.49	0.85	0.24	0.19	0.23	0.24
Malta	0.37	0.50	0.01	0.03	0.18	0.30
Netherlands ⁽⁸⁾⁽⁹⁾⁽¹⁰⁾	0.96	1.22	0.22	0.23	0.63	0.70
Austria	1.77	1.95	0.13	0.15	0.60	0.73
Poland	0.17	0.33	0.20	0.25	0.19	0.31
Portugal ⁽¹¹⁾	0.60	0.70	0.11	0.10	0.35	0.58
Romania ⁽¹²⁾⁽¹³⁾	0.22	0.12	0.18	0.20	0.13	0.10
Slovenia ⁽¹⁴⁾	0.87	2.16	0.35	0.34	0.23	0.29
Slovakia ⁽¹⁵⁾	0.18	0.34	0.16	0.20	0.12	0.28
Finland	2.51	2.44	0.29	0.32	0.65	0.77
Sweden	2.51	2.31	0.17	0.16	0.75	0.92
United Kingdom	1.09	1.09	0.16	0.14	0.46	0.46
Iceland ⁽¹⁶⁾	1.46	1.26	0.48	0.43	0.68	0.64
Norway	0.84	0.87	0.25	0.27	0.51	0.52
Switzerland ⁽¹⁷⁾⁽¹⁸⁾	1.00	1.00	0.02	0.02	0.69	0.77
Serbia ⁽¹⁹⁾	0.13	0.24	0.28	0.28	0.50	0.44
Turkey ⁽²⁰⁾	0.30	0.37	0.08	0.10	0.35	0.39
China (except Hong Kong) ⁽²¹⁾	1.01	1.39	0.27	0.30	0.12	0.15
Japan ⁽²²⁾⁽²³⁾	2.70	2.49	0.27	0.29	0.44	0.42
United States ⁽²⁴⁾⁽²⁵⁾	1.86	1.83	0.31	0.32	0.35	0.41

⁽¹⁾ Government sector: definition differs.⁽²⁾ Break in series.⁽³⁾ Business enterprise sector: break in series.⁽⁴⁾ Government sector: break in series.⁽⁵⁾ Government and higher education sectors: 2010 instead of 2012.⁽⁶⁾ Definition differs.⁽⁷⁾ Higher education sector: break in series.⁽⁸⁾ Business enterprise sector, 2012: definition differs.⁽⁹⁾ 2011 instead of 2012.⁽¹⁰⁾ 2008 instead of 2007. 2010 instead of 2012.⁽¹¹⁾ Government sector, 2007: definition differs.⁽¹²⁾ 2009 instead of 2007.⁽¹³⁾ 2010 instead of 2012.Note: when definitions differ, see http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/EN/rd_esms.htm.

Source: Eurostat (online data code: tsc00001), OECD

An analysis of R & D expenditure shows that more than half (54.9%) of the total expenditure in 2011 within the EU-28 was funded by business enterprises, while one third (33.4%) was funded by government, and a further 9.2% from abroad (foreign funds).

An evaluation of the data for the EU Member States also confirms that those countries with relatively high ratios of business enterprise expenditure on R & D to GDP also reported relatively high overall R & D intensities (2.80% or higher)⁸⁹.

We can see how the role of government in the synergy of Triple Helix concept still has mainly regulative character. Therefore one of the most important tasks of government policies is to establish incentive regulation framework. That element is still one of the lowest graded elements of entrepreneurship environment of developing countries (Singer, 2014). Entrepreneurship is the channel of commercialisation and realisation of innovation and it is very important to enable undisturbed entrepreneurship activity so that the innovation could find its way to the market. The government thereat has a crucial role.

⁸⁹ Expenditure data are usually expressed in relation to GDP; this ratio is often referred to as R & D intensity

The European Commission has through its Innovation union flagship initiative (which forms part of the Europe 2020 strategy) placed renewed emphasis on the conversion of Europe's scientific expertise into marketable products and services, through seeking to use public sector intervention to stimulate the private sector and to remove bottlenecks which stop such ideas reaching the market. There for the Innovation Union has three objectives, namely, to: 1. make Europe into a world-class science performer; 2. remove obstacles to innovation — such as expensive patenting, market fragmentation, slow standard-setting and skills shortages — that currently prevent ideas getting quickly to market; and 3. revolutionise the way public and private sectors work together, not least through innovation partnerships between the European institutions, national and regional authorities and business (Eurostat, 2015).

Enterprises/ entrepreneurial activity

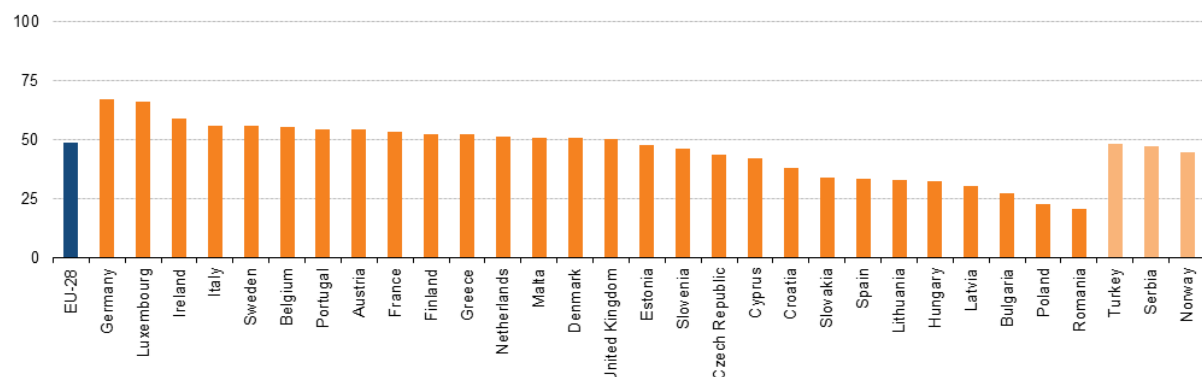
By talking about the knowledge based society which, as its basis, has knowledge based innovation, it is necessary to awake the market role as the source of new opportunities and observe innovation as an opportunity to use them. (Sutton, 1997 cited in Singer, 2014). Entrepreneurship represents the link between innovation and the market (Hisrich, Peters and Shepherd, 2011, 20). Innovation is developed and commercialized through entrepreneurial activity, which in turn stimulates economic growth (Hisrich, Peters and Shepherd, 2011, 14). Entrepreneurial activity framed within the structures of an enterprise and/or industry gives to the innovation sense and usefulness, marketability.

Businesses, as an essential part of entrepreneurial universities and a channel of idea commercialization, are increasingly inclining in their innovative activity towards the other subjects of macro environment while realizing usefulness and importance of collectiveness. They are forming R&D alliances to increase competitiveness and to share risk and costs. Alliances are no longer seen as a company weakness, but as an important form of learning. Partnerships, co-operative programmes, consortia with universities, government labs, other companies etc. are used to identify external technology, knowledge, trained human resources, new partners and markets. In that way companies are dealing better with technology & market uncertainty of today's changeable society (Eurostat, 2015).

According to Eurostat sources approximately half of EU-27 enterprises are innovative and a third of innovative enterprises cooperate with external partners – other enterprises or institutions (Eurostat, 2010). During the period 2010-12, 48.9 % of all enterprises in the EU-28 reported innovation activity. Compared with the period 2008-10, the share of innovative enterprises decreased by 3.9 percentage points (Eurostat, 2015).

Figure 1

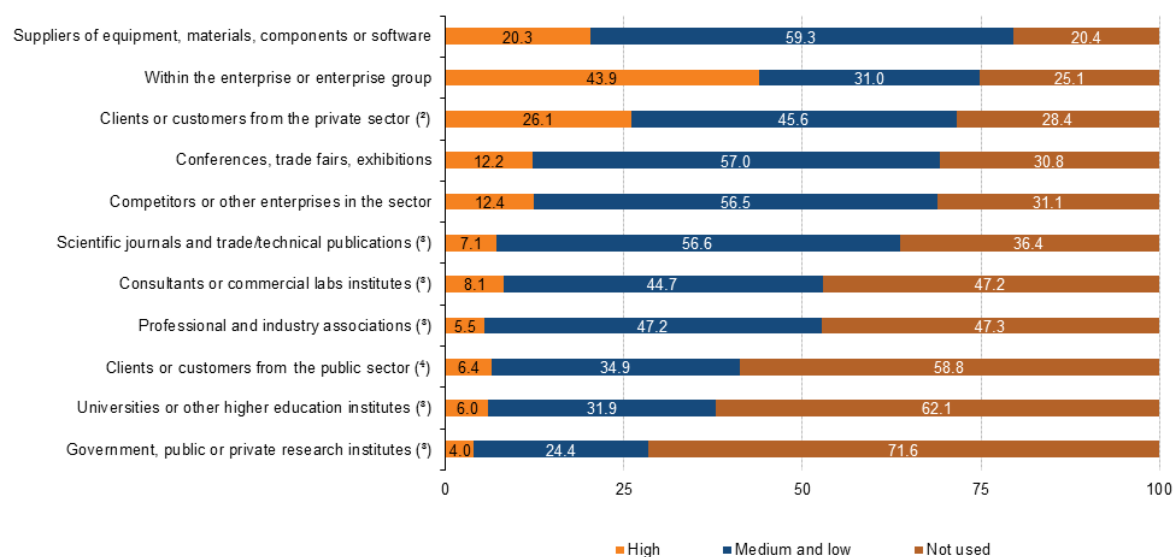
Share of innovative enterprises, 2010–12 (% of all enterprises)



(*) The survey reference period covers the three years from 2010 to 2012.
Source: Eurostat (online data code: inn_cis8_type)

Figure 2

Sources of information used for product and or process innovations by degree of importance, EU-28, 2010–12 (% of all product and or process innovative enterprises)



(*) Excluding the Czech Republic, Denmark, Ireland, France, Latvia and the United Kingdom. The survey reference period covers the three years from 2010 to 2012.
(*) Excluding also Spain.
(*) Excluding also Sweden.
(*) Excluding also Spain and the Netherlands.
Source: Eurostat (online data code: inn_cis8_sou)

Figure 2 shows the degree of importance given by enterprises to each type of source of information used for product and/ or process innovations: high; medium and low; and not used. 79.6 % of the product and/ or process innovative enterprises used information from their suppliers, with one fifth (20.3%) of innovative enterprises considering this source to be highly important. Less than two fifths of innovative enterprises (37.9%) in the EU reported having used information from universities or other higher education institutions between 2010 and 2012. Only 6% of them are considering this source to be highly important. However, among the Member States there was a wide range in the shares for this type of source, with more than 60 %

of the product and/ or process innovative enterprises in Austria and Finland reporting the use of information from universities or other higher education institutes, as was also the case in Norway. The share of product and/ or process innovative enterprises using information from the government, public or private research institutes was also relatively low. Only 28.4 % such enterprises in the EU are using these sources of information, with only 4% of them considering this source to be highly important (Eurostat, 2015).

Synergy effect of university, government, industry within knowledge space, innovation space and consensus space

The elements of Triple Helix interact within Knowledge Space, Innovation Space and Consensus Space. Their synergy, within the mentioned spaces, is led by innovation, knowledge, governance and leadership. Achieved synergy effect is manifested through knowledge based innovation, the support of today's society and the basis of Triple Helix concept.

Knowledge Space represents knowledge generation. It uses activities arising primarily from R&D performed by universities, firms and public research institutions, as well as non-R&D activities (such as technology adoption) combining existing knowledge in various ways. In that way Knowledge Space is a suitable base for building new knowledge that becomes base for a knowledge-based innovation (Ranga, 2011). Innovation Space represents formation and functioning of hybrid organizations that encourage and promote innovation. Such organisations are: technology transfer institutions in universities and firms, business support institutions (e.g. science parks, business/technology incubators) and financial support institutions (e.g. public and private venture capital firms, angel networks, seed capital funds, etc.). Within hybrid structures of incubators, science parks, „company” universities etc., innovation is created as a basic stimulus and building block of all Triple Helix activities (Ranga, 2011). Consensus Space represents formal and informal governance activities that bring together the U-I-G actors to brainstorm, discuss and evaluate proposals for advancement towards a knowledge-based society. It is meeting point of Triple Helix elements (Ranga, 2011).

We can see how the synergy of Triple Helix really has innovation as its basis which permeates every point where the three elements meet. Innovation is the starting point, the base and the ending point of the interaction university, industry and government.

Innovativeness of Triple Helix concept as the source of growth

Entrepreneurship is the process of creating something new with the necessary assumption that there is risk and reward present (Hisrich, Peters and Shepherd, 2011, p. 8). Entrepreneurship is a lot more than the increase of product and income per capita, it includes initiating and establishing change in business and society (Hisrich, Peters and Shepherd, 2011, pp. 13-14).

The international research project on entrepreneurship, the Global Entrepreneurship Monitor (GEM), is focused on the evaluation of the contribution of new enterprises, small businesses and existing businesses to economic growth of a country, emphasizing the holistic approach to entrepreneurship as a phenomenon of interaction of the individual and the environment which is present in all social organizations - the economy, education, research, culture, government, local government (CEPOR, 2006, p. 13). From this we conclude that the GEM project correlates economic growth and entrepreneurial activity dependent on the individual and its interaction

with the environment. A proven correlation between the level of entrepreneurial activity and indicators of national economic activity suggests that one-third of economic growth is a consequence of entrepreneurial activity (GEM, 2007). The growing entrepreneurial activity in growing businesses generates new employment and conditions prosperity of the country (CEPOR, 2007, p. 29).

The central issue of any economic policy is how to ensure conditions for an economic growth which is as fast and stable as possible. Some of the modern theories of growth find a response in the synergy of three key elements: capital accumulation, human factor and technological progress (Delač, 2010, pp. 49-55). Technological progress is the state of technology and the efficiency of human labour. In economic growth it is two-sided. It increases the efficiency of production, making possible for products which were produced at higher cost to be produced today at lower cost, and makes it possible to create new products as well (Delač, 2010, pp. 49-55).

Relationship between R&D/ technology and growth is agitated as a 'virtuous circle' of cumulative causation. R&D sustains a country's technology capability. In contribute to its capital accumulation it causes economic growth. Growth provides resources and incentives for R&D and investment (Ranga, 2011).

Within the GEM project growing companies, as the most effective connection between entrepreneurial capacity and economic growth of the country, are observed and evaluated primarily through innovation in the use of new technologies and in new product development (CEPOR, 2007, p. 29). Perceiving technological progress as the basis and driving force of innovation and the consequent growth, leads to the conclusion that it can be encouraged with appropriate economic policies. For economically productive technological progress to occur, it is necessary to enable the synthesis of science and industry, and enrich it with entrepreneurial activity (Etzkowitz, 2002).

Observed absence of cooperation of business sector with universities and academic community represents a significant obstacle to the transfer of knowledge to the business sector. The consequence of this absence of interaction between academic community and business subjects is deficient technological ability of industry which is manifested in insufficient innovativeness and in consequential fatal absence of competitive new products which could accumulate the necessary capital into the entrepreneurship structures and initiate the growth of companies (CEPOR, 2013, p. 18).

Education for entrepreneurship, in synthesis with commercially oriented research and development within the structures of entrepreneurial university concept, seem like an efficient way of acquiring the necessary innovativeness in using new technologies and innovativeness in developing new products, and consequent growth of companies. Entrepreneurial activity actualised in that way through entrepreneurial education, innovativeness and socially useful and marketable technological progress would cause the increase of share of growing companies and economic growth.

Education for entrepreneurship

For these suggestions to be put into practice, a change in our mental structure, our way of thinking is necessary. That is why we think it would be very useful to introduce elements which

stimulate creativity, innovativeness and adaptability in pre-school and school educational programmes. It is necessary to develop creativity and certain social skills as well as awareness of entrepreneurship in children from a very early age. During formal education it is vital to include high school and university students in practical projects in order for them to enrich their theoretical knowledge with practical experience and acquire the necessary skills. One such attempt was made within E4E programme, which is a project started by the Croatian Chamber of Economy with a vision to create a comprehensive education system for entrepreneurship as an integral part of lifelong learning adapted to the needs of modern world market. Numerous institutions closely cooperate in this project, thorough programmes implemented in the pre-school institutions, elementary schools, high schools and academies (Ministry of Economy, Labour and Entrepreneurship, Ministry of Science, Education and Sports, Ministry of Agriculture, Fisheries and Rural Development, Ministry of Regional Development, Forestry and Water Management, Ministry of Tourism, Croatian Chamber of Economy, Croatian Employers' Association, Croatian Employment Services, University College of Economics, Entrepreneurship and Management "Nikola Subic Zrinski" Zagreb, Open University "Petar Zrinski" Zagreb, Economic School "Katarina Zrinski" Zagreb, Knez Malduh Private School of Economics with Public Authority, Split, „Edu – permanent“ Ltd. for adult education, Novi Sad) (E4E, 2015).

We live in the age of entrepreneurs, when the entrepreneurship is accepted by many education institutions, government units, society and corporations. Education for entrepreneurship has never been so important in the sense of school subjects and academic research (Hisrich, Peters and Shepherd, 2011, p. 17). Bearing in mind the mentioned correlation of economic growth and entrepreneurship activity and the role of entrepreneurship in commercialisation of innovation, the phenomenon of trend in education for entrepreneurship does not come as a surprise. Therefore, studying about entrepreneurship and for entrepreneurship represents an important aspect of educational programmes of all EU members. Throughout Europe, learning strategies for entrepreneurship have been adopted, whose goals are to make the public aware of entrepreneurship, to develop positive attitude towards the lifelong learning for entrepreneurs, to introduce learning and training for entrepreneurship as key competences into all forms, types and levels of formal and informal education and learning (CEPOR, 2013, p. 60). Entrepreneurial competence represents one of eight key vital competences of every individual which represent an important prerequisite for personal fulfilment and development, role of every citizen in society and employability (CEPOR, 2013, p. 62).

Therefore the strategic direction of E4E project first and foremost refers to: 1. lifelong learning and training for understanding and gaining the economic system logic and the basic techniques of entrepreneurial thinking with the purpose of stimulating the general development; 2. developing an unique system of entrepreneurship education, as one of the 8 key competences of the EU, encompassing all social groups; 3. continuous development of Strategy of Entrepreneurial Learning, its implementation, monitoring and evaluation; 4. coordination and support of the structural dialogue of all relevant stakeholders in economy with the goal of raising the general entrepreneurial capacity and enhancing competitiveness; 5. strengthening the capacity of educational system (curriculum, teacher training, school management training) with the goal of successful implementation of the Strategy of Entrepreneurial Learning; 6. articulating

the policy of improving the human resources potential in the companies, in line with the actual economic development (E4E, 2015).

By increasing the number of institutions which implement E4E programme and with more intense contribution from the business sector in this cooperation, unthinkable possibilities for change and development are created.

Conclusion

In turbulent surroundings of today's world, in which the overproduction and flow are the only permanent elements, the idea enriched in innovation is the sole possibility of survival and growth. Observing the changeable surroundings of our activity we must not forget that any subject cannot function isolated. We are all part of organisations and systems. With planned and focused synergy of seemingly independent, isolated wholes, we can grow in the long-term and develop today's society which is looking for its base in knowledge and innovation. Knowledge based innovation, in order to get the shape of social basis and to be actualised through the market mechanisms, needs the entrepreneurial knowledge and skills which represent one of the eight key life competences of every individual of today.

The concept entrepreneurial university thereat imposes itself as the key component of society representing the intersection of knowledge, entrepreneurship education and activity, research and development. However, innovation coming from entrepreneurial university structures is meaningless without the entrepreneurial activity. Entrepreneurship makes it tangible, useful and marketable. Entrepreneurial activity framed within a company and industry makes the idea, knowledge, innovation concrete. It makes intangible components measurable components of economic growth and development.

The synergy of mentioned social elements and processes, generated within university and industry, has to be led and controlled in order to be socially useful. That is where the need for regulative role of government as a source of governance and leadership is imposed.

Governance and leadership with knowledge and innovation represent the base of interaction of university, industry and government.

With planned and controlled synergy of these key social structures expressed within the frames of entrepreneurial university numerous possibilities of entrepreneurial and economic growth are realised.

Namely, education for entrepreneurship in synthesis with commercially oriented research and the development of entrepreneurial university concept regulated by government seems like an efficient way of achieving the necessary innovativeness of entrepreneurial structures as well as the consequent growth.

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Political Doctrins of al-Suhrawardi's Philosophy of Illumination

Lejla Hoto

ABSTRACT

In this paper we elaborate on al-Suhrawardi's Philosophy of Illumination through the prism of four separate questions which are related to each other. First, we look into the essence of al-Suhrawardi's Philosophy of Illumination. The second part of this paper treats al-Suhrawardi's Philosophy of Illumination through the prism of his political doctrins. In the third part we examine al-Suhrawardi's execution in Aleppo (Syria) in the year of 1191 when he was just 36 years old. Finally, in the fourth part we look into Hossein Ziai's commentary on al-Suhrawardi's philosophy of Illumination. Prof. Hossein Ziai is a great authority on Iranian studies, but also a great authority of al-Suhrawardi's Philosophy (Hikmat al-Ishraq) as such.

1. Philosophy of Illumination (Hikmat al-Ishraq):

The history of the '*science of Light*' goes back to Hermes, '*father of the philosophers – walid al-hukama*', and continues through Empedocles, Pythagoras, and others until it reaches Plato. Al-Suhrawardi enumerates ancient philosophers, saints, prophets, and kings who are said to have experienced the internal Light in themselves and then passed it down. For Example, the divine Plato is said to have experienced wisdom as the Light in his soul when he was freed from Prime Matter, which gave him special powers associated with the '*elevated noble world*'. Such stories are also told about Hermes and other Greek thinkers, even Aristotle, but not just them.

Similar stories are also told of the Prophet Muhammad, does God bless him, who said:⁹⁰

'When I remove myself from the shackles of the body and become united with the elevated noble world, then my food and drink are from the real sciences and from divine Lights.'

Moreover, stories such as these are told of Abu Yazid al-Bistami, Husayn ibn Mansur al-Hallaj, and other prominent Muslim mystics, but even Old Testament figures such as Noah, Solomon, David, and Jakob are the subjects of similar stories. They are all said to have also experienced the divine Light and thus to possess manifest extraordinary power. In fact, the Light given to those who experience Illumination is said to have been passed down through several groups of branches of philosophers, sages, and mystics. It is passing down that constitutes al-Suhrawardi's view of the history of wisdom.

Shihab al-Din Yahya ibn Amirak ibn Abi al-Futuh al-Suhrawardi became well known under the name *„Shaykh al-Ishraq – The master of the eastern Light.*⁹¹

⁹⁰ Butterworth, Charles E., *The Political Aspects of Islamic Philosophy*, Center for Middle Eastern Studies, Harvard University Press Cambridge, Massachusetts 1992., page 325

⁹¹ Suhrawardi, Shihabuddin, *Al-Maqtul*, Orijentalna mudrost/Teozofija svjetlosti, Naučnoistraživački institut „IBN SINA“, Sarajevo 2011., page 257

He has established a new philosophic, theosophic but also gnostic (Sufi) tradition, well known as *al-Hikma al-Mashriqiyya- The Eastern Theosophy*, also known as *Hikmat al-Ishraq – The Philosophy of Illumination*.

Al-Suhrawardi's *Hikmat al-Ishraq - Philosophy of Illumination*, has been grounded on the foundation of the Islamic Peripatetic Philosophy and gnostic doctrines (Sufism). From the area of Sufism al-Suhrawardi's Philosophy of Illumination was based on the doctrines of Husayn ibn Mansur al-Hallaj (died in 922.), that experienced the same destiny like al-Suhrawardi did, but also on the doctrines of Abu Hamid Muhammad Al-Ghazali (died in 1111.), on whose famous work *Mishkat al-Anvar (The Niche of the Light)* al-Suhrawardi established his comprehension of Illumination as such.⁹²

The Illumination as such, from the perspective of two famous Sufi's from the twelfth century, 'Abu Hamid Muhammad al-Ghazali and Muhyuddin Ibn al-'Arabi has an ontological foundation. Both of them believed that the Illumination is enlightening the ontological plane of existence as such. According to both of them, human ability of observing the world around us, in other words, human eyes as such are just the corps of the Light, because they turn themselves to the Light. Despite of all, they are not able to rich the Light, but the Light is able to rich human eyes. And so, according to both of them, the Light made human eye existing after all. Because, without the Light human eyes would stay just a small corpuscles that are constantly escaping into darkness and selfdespondity.⁹³

Everything that exists is reflecting itself in the Light. In other words, everything that exists needs a Mirror, but the Light is a Mirror itself. And so, in that context, Ibn al-'Arabi is putting up that God as the Light above the Lights, who exists and appears upon Himself. As such He became the Light of the divine and Earth, that confirms a verse from the holy Qur'an:

God is the Light of divine and Earth! An instance of His Light is recess in the wall in that is placed the lamp. The lamp is in the icon lamp, and the icon lamp is like the shining star that is glowing through the blessing olive tree, that is, as Eastern so Western one. His oil as if it's shining, although the fire didn't touch Him. He became the Light above Lights! He guides His Light whom He likes to guide. God cites instances to the people. He knows everything. (Qur'an, XXIV:35)

Also, as mentioned by Ibn al-'Arabi's commentary of the holy Qur'an (*Tafsir*):⁹⁴

As divine so Earth are just shadows of God's face. Because, shadow doesn't exists by itself, then it exists by the Light. In other words, a shadow is determined by force of the Light. The Light acts free but shadow not. The Light is all around shining, but shadow shines only that way where it is directed by the Light.

⁹² Nasr, Sejjid Husejn, Tri Muslimanska Mudraca, El-Kalem, Sarajevo 1991., page 78

⁹³ El-Gazali, Niša Svjetlosti, BEMUST, Zenica 1997., page 6

⁹⁴ El-Gazali, Niša Svjetlosti, BEMUST, Zenica 1997., page 19

Al-Suhrawardi's Philosophy of Illumination (*Hikmat al-Ishraq*) identifies itself with those Iranian sages that gnostic doctrines are based on divine principles, doctrines that had been already existing in the Philosophy of Zoroastrianism. According to that al-Suhrawardi mentioned following:⁹⁵

Those are the Iranian sages that are accepted as the guides to the Truth. The Truth guided them the eternal Way, the Way to the divinity. These ancient sages couldn't be compared with those that were called magi (unreal), on the contrary. They were gifted with an exalted and enlightened sagacity, the same one that could be found in Plato's spirituality and the spirituality of his predecessors.

The same one revived again in al-Suhrawardi's *Hikmat al-Ishraq - Philosophy of Illumination*.

Al-Suhrawardi believed in that way being able to unite the divine sagacity (*hikmatu-l leduniyye*) with the ancient sagacity (*hikmatu-l atiqā*). Because, he believed that the sagacity in general is eternal, *philosophia perennis et universalis*, that in different shapes has been representative in different traditions.

Philosophia Perennis as an eternal sagacity may be accepted as reflection of the divine Beloved.⁹⁶

Because, even though human beings start existing as the pure essence they don't stay existing as such. After their genesis their *ego* starts developing, in other words, human beings begin falling from the essence into personality. After that process their *ego* became limited toward the Cognition, which happened as a result of being felt into personality. And so, the commitment of a human being as such is to protect its soul, to transcend itself from personality and return back to the essence of its existence.⁹⁷

Ibn al-'Arabi concluded that Shihab al-Din al-Suhrawardi, well known under the name „*Shaykh al-Ishraq*“ – *The master of the eastern Light*“ acquired all his mystical knowledge through direct communication with the divine.⁹⁸

Philosophy of Illumination appeared in the time before rationalisation of philosophical thought. In that time sagacity has been based on Intuition and internal Vision, contemplation and ascetic practices.

Al-Suhrawardi compared the unity of ancient and divine sagacities with the condition of a human soul before its captivity in personality (human body) as such. Because, before its captivity in personality, human soul, or exactly, the internal quintessence of the soul, its sparkle of the divine Light, that is the real, immortal kernel of the human soul as such, became divided into two parts.

⁹⁵ Nasr, Seyyed Husejn, *Tri Muslimanska Mudraca*, El-Kalem, Sarajevo 1991., page 79

⁹⁶ Kahteran, Nevad, *Perenijalna filozofija (Sophia Perennis) u mišljenju Rene Guenona*, Frithjofa Schuona i Seyyeda Hosseina Nasra, El-Kalem, Sarajevo 2002., page 170

⁹⁷ Ibidem, page 63

⁹⁸ Black, Antony, *The History of Islamic Political Thought-From the Prophet to the Present*, Edinburgh University Press, Edinburgh 2011., page 132

One of them stayed residing in the divinity, but the second one became confined in personality. Because of these circumstances human soul doesn't feel happy in personality as such. It doesn't accept personality and is constantly persuing after the second half of its own, that stayed existing in the divinity, yearning for a renewed unity with its divine *alter ego*.⁹⁹

Sufi's in general understood the divine unity (*tawhid*) as „*lossing of self and absorption in the divine Being*“, in other words, they '*die before the Death*'. They focused themselves to God's love and His relationship with the individuals (human beings) as such.

Shihab al-Din Yahya ibn Amirak ibn Abi al-Futuh al-Suhrawardi placed his whole teaching in the area of *Hannaqa*, an area that, in front of the outside vision simbolizes a refuge of the Sufi's, but in front of its hidden meaning it simbolizes an internal Being (*Ihsan nurani*, *Photeinos anthropos*), the divine microcosm in that is being stored the essence of its own. After that essence every human soul is being in pursuit. And so, the unity with its own may be comprehensive as the only possibility for a human soul to feel like being at home again, or coming back to its primar, natural conditions.

One of the first follower of al-Suhrawardi's Philosophy of Illumination - *Hikmat al-Ishraq*, but also one of Suhrawardi's famous students was Shams al-Din al- Shahrazuri. Shams al-Din al- Shahrazuri described his teacher with following words:¹⁰⁰

He was a teacher of twice sagacities: Intuitive and the speculative one, profoundly and thoroughly penetrating into both of them. Anyone was able to reach the pinnacle and the profundity that he has reached. He was talking about refinded, exalted and hidden things, about precious mysteries that are being locked in the treasuries, that doesn't mentioned anyone human but he. Anyone among the philosophers and theosophers doesn't reach the Secret, but he does. This is the evidence that his approach in sagacity was steady and his arm in philosophy long enough. His heart was established into Revelation (Kashf) and immediate Temptation (Dhawq), for the whole time he was engaged into comprehension of the eternal Light, like al-Suhrawardi mentioned:

The signs of mission of Love

by myself they appeared,

before myself they were hidden,

but in my effects they flourished.

⁹⁹ Nasr, Sejjid Husejn, Tri Muslimanska Mudraca, El-Kalem, Sarajevo 1991., page 93

¹⁰⁰ Suhrawardi, Shaykh Shihabuddin, al-Maqtul, Orijentalna mudrost/Teozofija svjetlosti, Naučnoistraživački institut „IBN SINA“, Sarajevo 2011, page 11-12

The Philosophy of Illumination (*Hikmat al-Ishraq*) during the time of a short al-Suhrawardi's live experienced a big success. It passed over the boundaries of the Islamic thought and has reached the thought of other traditions beyond the Islamic thought.

2. Al-Suhrawardi's Political Doctrins:

The significance of Sufism for political thought lay primarily in the doctrine of renunciation (*zuhd*), because following the doctrins of Sufism: poverty, self-humiliation and complete surrender of personality became the highest values in life. Its initial role in religious polity appears to have been giving religious meaning to social life under absolute rulers. It flooded into the space left by political disengagement.

Sufi's became especially committed to helping the poor, and so they became spokesman for popular grievances. They became '*a spiritual cement for the social order*'. Their leadership became a pathway to power. Their *Shaykhs* often became local leaders, '*pillars of society and established order*'. Elsewhere, Sufi leaders took their place alongside the '*ulama*', (*guardians of Islamic law – Shari'ah*) that sometimes merged with them.¹⁰¹

But, if we would like to ascertain al-Suhrawardi's views on the source and nature of political authority, we have to pay special attention to three questions:¹⁰²

1. What account of political philosophy can be determined from al-Suhrawardi's texts?
2. What kinds of political rule and political governance are discussed in al-Suhrawardi's writings?
3. Whether a distinctly Illuminationist political doctrine can be identified with them?

1. What account of political philosophy can be determined from al-Suhrawardi's text? Depending on this question we do need to underline that al-Suhrawardi didn't aim to examine the principles of political philosophy as philosophers before him did. For example, he never discussed the good city or the bad city, or he never didn't study the questions of justice and has never been concerned in any theoretical sense with types of rule. There was never a discussion of the virtues commonly associated with the study of practical philosophy nor a discussion of any other subject pertaining to the science of ethics. This means that none of al-Suhrawardi's philosophical works can be described as political philosophy or practical philosophy, including the science of laws.

2. What kind of political rule and political governance are discussed in al-Suhrawardi's writings?

Depending on this question al-Suhrawardi discussed the concept of rule. He related it to '*divine governance – tadbir ilahi*' and never to any specific political process. Upon to him, political regime are deemed meaningful only if, actual politics and the political regime of a state, a nation,

¹⁰¹ Black, Antony, *The History of Islamic Political Thought-From the Prophet to the Present*, Edinburgh University Press, Edinburgh 2011., page 133

¹⁰² Butterworth, Charles E., *The Political Aspects of Islamic Philosophy*, Center for Middle Eastern Studies, Harvard University Press Cambridge, Massachusetts 1992., page 306

or city, embody and manifest a divine dimension. Because, legitimate rule is said to relate to a wholly other source, to the 'unseen realm – 'alam al-mahsus' that is the corporal.¹⁰³

According to al-Suhrawardi one can be a legitimate ruler only by the command of God (*al-hakim bi-amr allah*,) thus governance or actual political dominion is justified in the strict sense if, and only if it is by and through linkage with the divine, by the command of God. One of the primary pillars of the Illuminationist view of politics is the way living rulers developing the capacity to become recipients of divine command.

3. Whether a distinctly Illuminationist political doctrine can be identified with them?

Depending on this question, and as a corollary to the first two questions, that is proposed to be called '*Illuminationist political doctrine*', must be viewed from a perspective comprising the following components:¹⁰⁴

The Islamic theory of Prophethood and of the manifest miraculous powers of prophets (anbiya') and saints (awliya), the Iranian tradition of a special manifest 'glory' or 'royal Light' given to kings who thus possess healing and 'occult' powers, the Iranian tradition of divine glory, as retold by al-Suhrawardi in a way that allows for any person who obtains wisdom (hikmah) to gain the divine glory that will come to radiate openly in that person as a divine Light (farra-yi izadi).

And so, space limitations preclude extensive discussion of these questions and corollaries, most readers will be familiar with the way they were treated in the Arabic and Persian sources prior to al-Suhrawardi. Given the general development of Islamic philosophy before al-Suhrawardi's time, we may safely assume that several textual traditions had influenced the formation of his '*Illuminationist political doctrine*'.

In theoretical political philosophy, these include works of al-Farabi such as '*The Political Regime – Kitab al-Siyasah al-Madaniyya*' and '*The Principles of the Opinion of the Inhabitants of the Virtuous City – Kitab Mabadi' Ara' Ahl al-Madinah al-Fadilah*'. Al-Farabi was especially inspired by Plato's philosophy, especially by his famous work '*Republic*', that he presented the whole of philosophy proper within a political frame-work.

The additional emphasis on the question of authority and on divinely inspired legitimate rule marks al-Suhrawardi's philosophical attitude, that in his reconstruction of philosophy of Illumination is decidedly more Platonic than Aristotelian.

Starting from a basic agreement with al-Farabi about the character of the ruler, al-Suhrawardi moves to a quite different position. For example, al-Farabi's view that the ruler of the virtuous city cannot be just any man, is categorically accepted by al-Suhrawardi, who posits that rule must be in the hands of prophets, divine kings, or special categories of philosopher-sages.

¹⁰³ Butterworth, Charles E., *The Political Aspects of Islamic Philosophy*, Center for Middle Eastern Studies, Harvard University Press Cambridge, Massachusetts 1992., page 306

¹⁰⁴ Ibidem, page 307

Moreover, al-Suhrawardi's ruler, like al-Farabi's holds the most perfect rank of humanity and has reached the highest degree of felicity.¹⁰⁵

Al-Suhrawardi never discussed the natural qualities of the ruler as does al-Farabi. Indeed, unlike al-Farabi, al-Suhrawardi maintains that, since everyone has the innate ability to seek wisdom, potentially anyone may become a leader. As noted, the foundational condition stipulated by al-Suhrawardi for gaining the right to rule is the attainment of wisdom, and this doctrine has become central to his Illuminationist political thought. Furthermore, al-Farabi considers the manifest signs of rulership to be human qualities, whereas al-Suhrawardi thinks that rulers demonstrate superhuman powers.¹⁰⁶

In each Suhrawardi's major works, the final section is devoted to a discussion of subjects bearing directly on political authority. The special attributes and qualities have been obtained by the practice of Illuminationist philosophy that are associated with enlightened wise philosophers and sages. Al-Suhrawardi began the most of these works with a passage addressing the audience for whom the work is composed as 'my brethren' or 'my companions'. The message is one of how they might gain a special kind of knowledge based on Illumination, Intuition, and Vision, which will give them access to wisdom and power and even bestow upon them a special quality of 'Light' associated with the divine kings of Iranian myth, namely, *farra-yi izadi* or *kiyan kharra*.

The souls of the divine philosophers and pure ones according to al-Suhrawardi are going to receive the Light of God, which will give them power over the elemental entities. Al-Suhrawardi identifies the enlightened ones as '*God's vicegerents on Earth*', who are said to be certain types of kings.¹⁰⁷

Any divinely inspired sage who becomes such a king will rule with utmost benevolence, times under his dominion will be enlightened, and he will manifest powers. Conversely, whoever can perform extraordinary acts, see the future, and be counted among the sages of the age is the one fit to rule. This is the essence of al-Suhrawardi's political doctrine.¹⁰⁸

For example, if a young prince should desire to become a ruler of the world, if him should be given the robe of Royal Authority and gain majesty, such as the ancients had obtained, then he should study the '*science of Lights – the philosophy of Illumination*'. Al-Suhrawardi and the others after him, named upholders of Illumination, are the only ones who know its secrets. This knowledge can't be found merely in books, then in the political philosophy of the Peripatetics, because there is anyone who follows the way of the Peripatetics that is included in the divine wisdom, into '*knowledge of the Lights*'.

¹⁰⁵ Butterworth, Charles E., *The Political Aspects of Islamic Philosophy*, Center for Middle Eastern Studies, Harvard University Press Cambridge, Massachusetts 1992., page 312

¹⁰⁶ Butterworth, Charles E., *The Political Aspects of Islamic Philosophy*, Center for Middle Eastern Studies, Harvard University Press Cambridge, Massachusetts 1992., page 313

¹⁰⁷ *Ibidem*, page 317

¹⁰⁸ *Ibidem*, page 330

Because, wisdom and its special history, as told by the Illuminationist sages in the service of Royal Authority, are the quintessence of al-Suhrawardi's political doctrine.

That Light of the Truth, which bestows goodness, nobility and justice according to al-Suhrawardi have been obtained by the greatest of Persian kings:¹⁰⁹

When the soul is purified, it will be illuminated with the Light of God. This is as God has said in His revelation: 'God guards those who believe and will deliver them from darkness unto Light.' That is, from the darkness of ignorance unto the Light of knowledge. And when divine Light and the Sacred Tabernacle appear to the purified one, he will become illuminated. He will then influence corporeal bodies as well as other souls. Luminous authority will appear in him, and as he becomes acquainted with the Great Luminous Being and becomes illuminated with the sacred Light, other beings will obey him. Matter will be affected by him. And his cell and prayer will be heard in the Heavens, especially by the Angels. As he will be attributed with auspicious, fortune, goodness, nobility, and justice, he will travel to the lofty horizons, triumph over his enemies and be protected. He will gain a magnificent countenance and obtain powerful Royal authority. He will capture the Light of divine confirmation and victory as did the great Persian Kings.

3. Al-Suhrawardi's Execution in Aleppo 1191:

Al-Suhrawardi, a famous young ill-clothed Sufi, was often accused by many Islamic scholars, especially by the guardians of Islamic law (*Shari'ah*), because of his loyalty to the ancient Iranian sages, especially to the Zoroastrian sages. The guardians of Islamic law proclaimed his teaching as non Islamic, but it isn't so. The Islamic tradition does allow including of different elements of the ancient thought into Islamic tradition, which gave the possibility to Islamic mystics to take over the elements of their ancient sages. Accordingly, as a support to al-Suhrawardi's philosophy of Illumination, but the Islamic spirituality in general, Louis Massignon mentioned:¹¹⁰

'Islamic spirituality is the light through that Iranian people observe this world.'

The guardians of Islamic law (*ulama'*) believed that young mystic-philosopher (*Sufi*) was engaged in activity deemed contrary to the divine law and thus considered a threat.

Part of what might contribute to such a reputation is the belief that al-Suhrawardi had *magical powers*, such as those he himself had discussed in association with the royal authority of King Afridun. And so Ibn Abi Usaybi'ah states that al-Suhrawardi was reputed to know the science of

¹⁰⁹ Butterworth, Charles E., *The Political Aspects of Islamic Philosophy*, Center for Middle Eastern Studies, Harvard University Press Cambridge, Massachusetts, page 331

¹¹⁰ Nasr, Sejjid Husejn, *Tri Muslimanska Mudraca*, El-Kalem, Sarajevo 1991., page 100

magic. He further states that even extraordinary acts had been performed by him in this art, that is magic.¹¹¹

Thus, he was deemed an infidel and sorcerer who by recourse to the use of magic had won over the young prince, and was corrupting his mind. The young prince, al-Malik al-Zahir al-Ghazi, became the legitimate ruler of the age. The guardians of Islamic law feared that he was trying to undermine the authority of the law and the Abbaside Chaliphate in those name the great Sultan Saladin was ruling Egypt and Syria and fighting of the Crusades. According to this version, al-Suhrawardi was charged with claiming to be a prophet, but not believing in God's attributes, holding heretical opinions, and corrupting the mind of al-Malik al-Zahir al-Ghazi. He was said to be against the law of the land, to claim powers that put him above the *Shari'ah*, and to have performed certain acts to prove his divine inspiration. He was also accused of believing in wisdom of the ancients. Finally, though this was not a charge, he was alleged to have been a sorcerer and magician.¹¹²

Al-Shahrazuri, al-Suhrawardi's famous student admitted al-Suhrawardi's becoming confidant by the ruling prince in Aleppo, but he denied that he had sought corrupting the prince's mind. But, despite of all, al-Shahrazuri's appealing that explains al-Suhrawardi's honesty and purity of his teaching, it didn't help.

Sultan Saladin, armed with a prescript from the judge al-Fadil (guardian of the Islamic law), had sent to al-Malik al-Zahir al-Ghazi a saying that Shihab al-Din Yahya Ibn Amirak Ibn Abi al-Futuh al-Suhrawardi must be executed and under no circumstances merely exiled.¹¹³

Upon the order of the leading Sultan Saladin, the young Sufi had been executed by the young prince al-Malik al-Zahir al-Ghazi in Aleppo 1191. There are many versions about the manner of al-Suhrawardi's execution.

While some written sources as the manner of his execution note that al-Suhrawardi was trown into dungeon and died, similar to his famous predecessor, Husayn ibn Mansur al-Hallaj (died 922.), other written sources claim al-Suhrawardi was crucified as was Jesus Christ. But, in the end, we know that he really died in one of these manners. Because of the circumstances, and the manner in which he died, al-Suhrawardi became well known under the name '*al-Maqtul* – an executed teacher.

4. Hossein Ziai's Commentary on Suhrawardi's Hikmat al-Ishraq

The Philosophy of Illumination:

The nature of the '*Illuminationist philosophy*' has long been a matter of controversy, because of misunderstanding of principles that were promoted by the Philosophy of Illumination as such.

¹¹¹ Butterworth, Charles E., The Political Aspects of Islamic Philosophy, Center for Middle Eastern Studies, Harward University Press Cambridge, Massachusetts 1992., page 339

¹¹² Ibidem, page 341

¹¹³ Butterworth, Charles E., The Political Aspects of Islamic Philosophy, Center for Middle Eastern Studies, Harvard University Press Cambridge, Massachusetts 1992., page 342

As the refutation of these controversies Hossein Ziai, a great authority of Iranian studies, cited following words mentioned by Shams al-Din Shahrazuri, which was a famous student of al-Suhrawardi, well known as '*Shaykh al-Ishraq*':¹¹⁴

The Philosophy of Illumination (Hikmat al-Ishraq) is the philosophy based upon Illumination (ishraq), which is unveiling and intuition (al-kashf ve al-dhawq), or the philosophy of the easterners, which is to say, the Persians. It is related to the Illumination that is the manifestation of the intelligible lights, or their first principles, and their emanation of Illuminations upon the perfected souls when they are abstracted from bodily matter. The Persians relied in their philosophy upon intuition and unveiling. The ancient philosophers of Greece did the same, with the exception of Aristotle and his school, who relied only upon reasoning and syllogism.

Intuition as such plays an essential role, both on the basic level of sensation and in the form of direct mystical awareness of the supersensible entities that al-Suhrawardi calls '*the immaterial Lights*'. Al-Suhrawardi's philosophy identifies itself with the philosophy of pre-Aristotelian sages, particularly Plato. He was convinced that this wisdom was also expressed by the ancient sages of other nations, especially the Egyptians, as represented by Hermes (*father of the philosophers – walid al-hukama*), and the ancient Persian sages and righteous kings.

Al-Suhrawardi himself identifies two periods in his thought, divided by the dream of Aristotle revealing the key doctrine of knowledge by presence and by his acceptance of the reality of the Platonic Forms. Works written before that time were Peripatetic in doctrine, while his later works reflected his Illuminationist thought.¹¹⁵

The great French orientalist Henry Corbin saw al-Suhrawardi's Philosophy of Illumination (*Hikmat al-Ishraq*) as an '*Oriental theosophy*', in other words, upon to Henry Corbin the Philosophy of Illumination represents the most mature of al-Suhrawardi's thought at all. The use of renderings like '*theosophy*' and '*oriental*' also indicate the fundamentally mythological focus of Corbin's interests and interpretation.

Al-Suhrawardi's primary cultural identification was with the ancient Iranian sages, but especially with the Zoroastrian-oriented Philosophy of the Illumination of Mughal India.

Because, as al-Suhrawardi mentioned:¹¹⁶ '*Intuitive philosophy has priority in establishing the principles of philosophy*'.

¹¹⁴ Walbridge, John&Ziai, Hossein, Suhrawardi-The Philosophy of Illumination, A New Critical Edition of the Text of Hikmat al-ishraq, Brigham Young University Press, Provo, Utah, 1999., page xvii

¹¹⁵ Walbridge, John&Ziai, Hossein, Suhrawardi-The Philosophy of Illumination, A New Critical Edition of the Text of Hikmat al-ishraq, Brigham Young University Press, Provo, Utah, 1999., page xviii

¹¹⁶ Ibidem, page xx

Terms used, such as *dhawq*, *al-hikma al-dhawqiyya*, and '*al-'ilm al-huduri*, *al-'ilm al-shuhudi*, all indicate intuitive philosophy. Intuitive philosophy is mostly being interpreted as a '*mystical experience*'.

So, the combination of discursive and intuitive philosophy into one consistent system, which is the Philosophy of Illumination, became al-Suhrawardi's major achievement in eyes of the medieval biographers and commentators on Illuminationist texts.

Al-Suhrawardi's Philosophy of Illumination has strongly influenced many other later philosophies. But, perhaps the major revival of the Illuminationist philosophy is associated with the so-called '*School of Isfahan*', from the late sixteenth and seventeenth centuries and a curious revival of interest in Zoroastrian lore in Mughal India at about the same time. The interest in al-Suhrawardi's Philosophy of Illumination, shown by the members of the '*School of Isfahan*' was largely philosophical. The most significant member of the '*School of Isfahan*', but also the most significant Islamic philosopher of the later period was Mulla Sadra Shirazi. He was a famous student of Mir Damad, the founder of '*School of Isfahan*'.

But, whereas al-Suhrawardi and his followers had considered existence to be *i'tibari* – a being of reason, produced by the mind's activity, Mulla Sadra held that there was a deeper sort of existence to which al-Suhrawardi's critique of Avicenna (Ibn Sina') didn't apply. Thus, in the later tradition of Iranian philosophy were existing two wings of the Illuminationist tradition:¹¹⁷

1. Illuminationist tradition faithful to al-Suhrawardi on the issue of the primacy and quiddity;
2. Illuminationist tradition led to Mulla Sadra, who criticized al-Suhrawardi in major points, but still defined itself in terms of issues that al-Suhrawardi had first set out;

5. Muhammad Ibrahim Sadr al-Din Shirazi's Transcendental Theosophy:

Sadr al-Din Shirazi, well known as Mulla Sadra, grounded a new philosophical/theosophical doctrine, that became known as '*The Transcendental Theosophy – al-Hikmat al-Muta'aliyah*'. It was grounded on the foundation of the holy Qur'an, sayings of the Prophet Muhammad and the ancient Islamic sages, but also at the teachings of the Peripatetics and gnostic doctrines (*ma'rifah*).¹¹⁸

Through the prism of the '*Transcendental Theosophy*' Mulla Sadra succeed to reconcile stances of the theological, philosophical, but also Islamic gnostic doctrines.

Mulla Sadra's famous work is known as '*Transcendental Theosophy about four Intellectual Journeys – al-Hikmat al-Muta'aliyah fi al-Asfar al-Arba al-Aqliya*'. This famous work of Mulla

¹¹⁷ Walbridge, John&Ziai, Hossein, Suhrawardi-The Philosophy of Illumination, A New Critical Edition of the Text of Hikmat al-ishraq, Brigham Young University Press, Provo, Utah,1999., page xxii

¹¹⁸ Nasr, Seyyed, Vodič Mladom Muslimanu, Biblioteka Islamistika, Sarajevo 1998., page 109-110

Sadra is also well known just as 'al-Asfar'. *Al-Asfar* is a plural of the Arabic word 'Safar – Journey'.

Transcendental Theosophy – al-Hikmat al-Mute'aliyah, grounded by Mulla Sadra Shirazi, resembles a lot al-Suhrawardi's famous work 'al-Hikmat al-Ishraq – The Philosophy of Illumination'.

According to his work Mulla Sadra became accepted as an imposing inheritor of al-Suhrawardi. In other words, it can be said that Mulla Sadra's *Transcendental Theosophy* emerged on the foundation of al-Suhrawardi's 'al-Hikmat al-Ishraq – The Philosophy of Illumination'.¹¹⁹

Although it was Shihab al-Din al-Suhrawardi that established Philosophy of Illumination as such, it is an undeniable fact that also Mulla Sadra acquired the most of his knowledge exactly from Suhrawardi's Philosophy of Illumination as such.

In that way he presented himself as the sage that aimed the fulfillment of theosophical doctrines that al-Suhrawardi had started.

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¹¹⁹ Nasr, Seyyed Hossein, *Sadr al-Din Shirazi i njegova Transcendentna Theozofija*, Naučnoistraživački institut „IBN SINA“, Sarajevo 2001., page 123

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Mapping Of Interest Groups Mobilization In Cross-Border Cooperation Programmes

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ABSTRACT

Interest group research primarily focuses on the grand questions of power and influence within particular policy fields and governance levels. At the same time, there is a growing literature on the mobilization of interest groups. This paper deals with the mobilization of actors in a multilevel setting. More in particular, it seeks to answer the question: which actors mobilize to seek funding in European cross border cooperation programmes. In addition, we examine the specific ways of mobilization and the conditions under which actors decide to mobilize. Empirically, we draw from the data regarding the Interreg Flanders-Netherlands Operational Programme.

Key words: Mobilization, Interest Groups, Cross-border Cooperation, EU Funding

Introduction

Studying of interest groups activation in public policy domains is not a recent phenomenon. The presence of interest groups, has inspired a generation of scholars to investigate fundamental issues in relation to interest groups' lobbying, advocacy, complexities of policy and decision-making. Investigating on how and why interest groups get mobilized in certain policy domains, remains one of the peculiar feature of political science research. So far, a wide array of studies has posed important questions ranging from the mobilization of groups to the issue, tactics, strategies and influence they deploy in public policies (Baumgartner 1998, 2001, 2007; Wittenberg, Halpin and Binderkrantz, 2011 Kluver 2010). The growing interdependence between government levels, has contributed towards studying interest groups primarily in a multilevel context. Some of the earliest systematic studies have provided us with the knowledge on how concrete policy fields trigger interest groups to mobilize for representing their interests. (Hooghe and Marks 1996, Milbrath 1963, Salisbury 1984, Schlozman 1986, Tarrow 2011, Baumgartner 2007).

Clearly, the European Union (EU) is one of the main targets where interest groups attempt to represent their interests through collective forms of representation. Some earlier studies on interest groups literature have strongly relied for entailing various forms of interest groups' representation within European Union. (Hooghe and Marks 1996, Kluver 2010, Eising 2007). The EU has in particular fuelled the enthusiasm for empowering European regions at the EU level, in correspondence to their growing economic and cultural importance. (Bomberg and Peterson 1998). As a consequence, this has not surprisingly invoked a growing participation of interest groups into different EU policy areas. Many of the mobilization features have been

documented extensively: the involvement of sub-national governments in EU policy-making, tracing policy activity and strategy of sub-national governments throughout the Union to an EU-related agenda, the establishment and activity of organizations for interregional cooperation clustered around EU programmes, as well as the ever-growing numbers of regional information and liaison offices in Brussels (Jeffrey 2000).

However, this study takes an additional approach by focusing on interest groups in the EU Funding area, through tackling the following research question: what kind of actors get mobilized for cross-border cooperation programmes? And more specifically, how does this mobilization occur, in practice? To our knowledge, no one has yet looked specifically at interest group organizations in Cross-Border Cooperation Programmes. We address this gap here.

Many studies focus on interest involvement in policymaking, but far less knowledge is concentrated on what drives interest groups to mobilize at the international level or how interest communities emerge and develop (Risse 2002; Alter and Meunier 2009). Mobilization and organizational maintenance are important strategic choices that interest groups make (Gray and Lowery 1996). The more we learn about the role of actors in politics, the more helpful political scientists may find mapping techniques. (Alter and Meunier, 2009). By not focusing on subsets of interest organizations, we could rather include different types of organizations which would potentially lead to generic conclusions on the behavior of interest groups, thus making the connection with the broad literature on state-society relations (Beyers and Hanegraaff, 2013). Although we have currently considerable knowledge on the effects of societal interest involvement in policymaking, but far less knowledge on what drives interest groups to mobilize (Alter and Meunier 2009).

At once, the importance of interest groups mobilization is one of the many elements of political representation. We start from the assumption that interest organizations are rational actors which mainly mobilize for the purposes of gaining political representation. We account for active groups in this specific policy-area, which we consider as representative of the most prominent interests in the community. To address the main research question of this paper, we rely on the broad literature of interest groups politics which raises important perspectives on how interest groups get mobilized while pursuing their political agendas.

Theories of mobilization are an area of advance, and new elements of theory have been added to the literature. Previous scholars have looked at the dilemmas of mobilization, which make some organizations to become active for policy issues. Some studies have put a great emphasis on resources, as a necessary arrangement for collective purposes. (Beyers & Kerremans 2007, Eising 2007, Hanegraaff and Beyers 2013). In their analysis, Marks et al (1996) found no support for this hypothesis, but recent research by Blatter et al (2009) showed that resources have a positive effect of the extensiveness of EU-level activities. More prominently, public interest groups need to try to overcome the collective action problem in order to mobilize supporters and resources for their cause (McCarthy and Zald, 1977). Various ‘resource dimensions’ – they list resources such as members, financial resources and selective benefits – are important apart from the choice of which set of policy issues to engage in. (Gray and Lowery, 1996). Next to it,

mobilization is also a matter of agenda setting and lobbying, which have implications for crucial issues of the political agenda.

Next to it, mobilization is also a matter of organizational and strategic choices. Eising (2007) showed how the EU institutional context does have a strong contribution towards making interest groups more eager to mobilize in a policy area. His findings provided consistent explanations on taking into account all dimensions, when analyzing focal issues of interest groups' mobilization. Also because the organizational dynamics of organizations derive from their involvement in certain public policies, or the region, or the social group from which they draw their members (see Gray and Lowery 1996).

The paper is structured as follows. We start with a brief context of the European Commission (EC) policy-making, as the core institution providing opportunities for groups to mobilize for selected policy-areas. Then, we elaborate on theoretical perspectives about mobilization. Next to it we formulate the concrete research hypothesis drawing from this framework. Then we elaborate on methods and data collections used for drawing the empirics. The last part of the paper is dedicated to empirical analysis that draws from mapping of 835 interest organizations which were mobilized on the Interreg Flanders-Netherlands Programme between 2007 – 2013, where we base our empirical results.

Collecting data on a full and original sample of 835 organizations, allows us to grasp the full picture of interest groups' mobilization in this portion of EU interest groups. Not surprisingly the findings confirm that the institutional context of the cross-border programme plays a robust role for the interest organizations to mobilize at the first place. As the findings show later on this article, it is mostly national and sub-national organizations that mobilize for cross-border cooperation programmes. Next to it, an equal distribution of organizations in both regions where a programme does expand, is highly expected. However, it comes across that the type of the organization is not significantly related to the type of issue (economic vs environmental and societal), for which an organization gets mobilized – at the first place.

The European Commission's Role On Territorial Cooperation

Within the EU, territorial cooperation across member states' borders has accentuated a system of multilevel governance. Although the extent to which political sovereignty has been transferred from member states to the EU is disputed, the EU represents an extension of political space beyond the territorial border of the nation-state and, as such, is taking the form of a trans-territorial, multi-level polity (Marks 1993). This multilevel arena of representation, offers stakeholders new channels for mobilization in addition to numerous access points for funding opportunities. Multilevel governance has *"dispersed authority away from central government—upwards to the supranational level, downwards to subnational jurisdictions, and sideways to public/private networks"*. (Hooghe and Marks 2001). This scattering of authority has empowered and encouraged groups to forge the representation of their interests at the European level.

The European Commission has played an indispensable role in terms of bridging the Union with interest groups (Mazey and Richardson, 2002). Through, introducing a variety of programs and projects that derive from its policies, it has significantly contributed to the direct increase of interest group participation. (Kohler-Koch and Finke 2007: 160). Next to it, transforming territorial cooperation into its top-priority agenda, it has helped to ‘developing cross-border economic, societal and environmental activities through joint strategies for sustainable territorial development’ (EC, 2006a). Its core financial instrument, namely the European Regional Development Fund (ERDF), allocates EU Funding to the European Regions while also promoting territorial cohesion next to reducing the disparities between levels of development of the European Regions.

The EU has stimulated cross-border cooperation by subsidizing projects in the border areas of the EU Member States. Through its core financial instrument, namely the European Regional Development Fund (ERDF), the EU allocates subsidies to the European Regions with the purpose of promoting territorial cohesion next to reducing the disparities between the levels of development of the European Regions. The very complex institutional structures of EU Funding within Cohesion Policy, mitigate into concrete Cross-Border Cooperation Programmes, under the large strand of territorial cooperation. On a smaller scale, the Programme is ‘divided into’ concrete projects that directly embed actors across the borderline, which strive for getting the EU Funding. Stakeholders and other actors get mobilized as: applicants for benefiting from the EU Funding. Benefiting from the grant-schemes of the EU Funding, implies also that they have to co-finance their project proposals in similar amounts as requested from the EU Funding.

Notwithstanding the enthusiasm to promote territorial cooperation, reduction of disparities between levels of developments of European regions, the place and significance of this policy belongs to the interest groups. Although many authors now consider the supposed influence of the European Union towards Member states (see Borzel et al), interest organizations directly represent their interests through EU policies, i.e programmes for cross-border cooperation. As such, the cross-border cooperation programme becomes ‘the venue’ for channeling interest representation. A precise set of conditions; either institutional context or the organizational features, can underpin the opportunity structures that are created for interest organizations.

Theoretical Perspectives On Mobilization Of Interest Groups

Scholars have been traditionally enthusiastic about the representation of interest groups. One of the most overstated analytical question during the 1960s was, the one related to mobilization. (Baumgartner and Leech, 1998). The overall group-mobilization literature tells us a lot about what groups do in certain policy areas. Attention to mobilization questions has grown to pivotal questions on how and why actors get mobilized towards a policy issue. Even there is not a unified theory in this area, substantial progress towards combining attention to individual behaviors, internal group dynamics and the to the broader context of the group’s social and political environment, has been made. (Baumgartner and Leech, 1998).

A predominant explanation for group mobilization was the pluralist perspective of Truman. One of the most appealing elements of this perspective was the concept of the equilibrium of political forces based on the ability of 'potential groups' to mobilize when their interests were threatened (Truman, 1951). In many occasions, groups get mobilized for political action, whenever they feel it is in their interest to do so. Also, groups could most likely organize in response to economic crises, wars and other threats. The individual-level perspective of initiatives to joining groups was addressed by Truman (1951) and Olson (1965) has provided with insightful perspectives on why individuals join interest groups, or when and how organization's lobbying efforts have an intrinsic effect on policy-makers' decisions. In general, focusing on the stakeholder's side of relationship, how groups take action and for what kind of purposes has led to a few strong conclusions about collective action.

However, after the 1960s, the assumption that all groups were powerful came under attack. Even that all potential groups would have an equal chance of participating in the pressure system, some groups: notably small, business-oriented ones, had great advantages in organization and were likely to mobilize as Truman described. Olson (1965) demonstrated that that some group had advantages and were likely to mobilize, while others were at a considerable disadvantage and were unlikely ever to mobilize even to a fraction of their potential.

When examining the stakeholders' side of the relationship, some studies looked at how actors and stakeholders act for the main purpose of protecting their interests (Ahlstedt & Jahnukaian, 1971; Frooman, 1999; Savage, Nix, Whitehead & Blair, 1991). Controversial definitions about what an interest group refers to prevail in the literature. Following, Salisbury: "our scope is to include every active unit, from the isolated individual to the most complex coalition of organizations that engages in interest-based activity relative to the process of making public policy. (Salisbury, 1994). We are ready to incorporate all kinds of organizational variety that have active members, staff, or individuals. (Baumgartner and Leech, 1998).

More recent accounts – notice how interest groups attempt to differentiate themselves from similarly perceived groups and confirm their unique ownership of an identity through their goals and actions. (J. Rowley 2003). As it is oftentimes noticed interest groups may not 'spring naturally' from society, whereas multiple factors interfere in order to facilitate this progress in certain segments of the society. (Baumgartner and Leech 1998). Several factors stand between a desire/ need to act and actual mobilization. Even though there might be a perceived need of urgency to take collective action and to protect the interests, sometimes organized interests may not do so because the stakeholder group lacks the resources to organize a mobilization effort. (Timothy J. Rowley, Mihnea Moldoveanu, 2000).

First of all, interest organizations become active for a specific policy domain, because they are pursuing their aims, within that policy field. It is mostly due to the nature of the public policy that it contributes to nourish interest groups' representation. Thus, the cross-border cooperation programmes wave the mobilization process, in many ways. Cross-border cooperation came alongside with the general accentuation of the importance of the regions in the European politics,

following the 1988 reform of the Structural Funds programme, the creation of the Committee of the Regions, the introduction of the subsidiarity principle in the Maastricht Treaty etc. But more in particular, organizational features play an indispensable role for the mobilization to occur, alongside with the deep core beliefs that each organization endorses.

Hypotheses

Starting from the general theoretical framework described above, we formulate a few hypotheses about the mobilization of interest groups in cross-border cooperation programmes.

A way to look at the mobilization is through focusing on the institutional context. The institutional context defines the opportunities for getting in touch with EU decision-makers (Meynaud and Sidjanski, 1971: 468; Marks and McAdam, 1996; Pollack, 1997; Lowery, 2007). Since the European Commission is the most important contact partner of interest groups (Mazey and Richardson, 2002) – it is expected that many of these actors will mobilize for cross-border cooperation programmes – as a substantial form of contact with the Commission as well.

Yet, because of bridging the Union with interest groups, cross-border cooperation programmes, there will be a direct increase on interest organizations' representation. (Kohler-Koch and Finke 2007: 160). Although the European Commission promulgates cross-border cooperation through its core financial instrument, namely the European Regional Development fund (ERDF), it is more expected that organizations operating at local and national levels for the regions of cross-border cooperation programme will get mobilized. Given its complex institutional structure, the EU Cohesion Policy converts into a Cross-Border Cooperation Programme, it is expected that local and national organizations will mobilize for the strand of territorial cooperation. As such, national and local organizations having more frequent interaction with each-other at the territorial cooperation working level, will get mobilized, rather than the ones opting for direct access to the Commission.

Also, because of its nature, the Commission is responsible for drafting policy proposals or sorting out their details (Eising, 2007). By following a top-down approach there is not a direct contact between the Commission and interest groups. While the Commission focusses on those aspects that are contested and/ or deemed to be crucial – interest groups from the other side are aiming to establish broad policy principles, or raising their stakes in favor of the cross-border cooperation policy alternative in this case.

National organizations organize members and represent their interests at domestic levels. (Eising, 2007). But for them, EU-level activities, such as mobilizing for EU funding for cross-border cooperation, is an addition task. And sometimes it is also due to their scarce resources, that they tend to rely on EU associations for the representation of their interests at the EU level. (Bennett, 1997).

Hypothesis 1: National and Sub-National Organizations, will mobilize more for Cross-Border Cooperation Programmes, than European level organizations.

Next to it, we are also looking at the types of organizations that are mobilized for cross-border cooperation programmes. The Cross-Border Cooperation Programme has a profound impact on the economic activities of border regions. Due to its nature, it allows crucial activities to be employed by business interests or non-governmental organizations. With this diversity of interest groups, there are different forms of interest representation. (Bouwen, 2004).

We then look at how business interest representations (companies, associations and consultants) and NGOs get mobilized for a specific range of issues within the cross-border cooperation area. Alongside NGOs, there is noted a considerable number of business groups emerging during 1999, that sought to co-ordinate themselves in early phases of public policy issues. (Hocking and McGuire, 2002). We try to calculate how NGOs and business interests care about similar issues, since most of the times groups actively seek to expand or contain certain issues of their interest. (Birkland, 1989). In addition, interest groups organizations, think-tanks and other business interests accordingly get mobilized for similar issues (De Bruycker and Beyers, 2015). By looking further at ad hoc configurations on for specific project proposals, we are able to capture patterns of NGOs and business organizations across policy issues within a cross-border cooperation programme.

Although, in the literature there are different perceptions about the role that business and interest organizations play in a policy issue, more in general business have the ability to engage in risk-taking incentives, needed to innovate and contribute to social and economic development. (Berland, 2014). Although, as noticed previously in the literature, NGOs and business organizations have usually different organizational logic (Olson, 1965). We believe, they are also different in the purposes they follow within a cross-border cooperation programme. We expect significant variations to the issues they follow when they get mobilized.

This leads to the following hypothesis:

Hypothesis 2: Business interests, will mobilize for economy issues for Cross-Border Cooperation Programmes, whereas NGOs will mobilize for environmental and societal issues.

We also account for the basic role that regions play, in a cross-border cooperation programmes. Overall, it is stated in the nature of a multi-level governance, to emphasize the role for regions in the EU policy processes (Tatham, 2008). The idea that regions seek to promote their interests directly at the European level has been broadly promoted, since the beginning of the 1990s (Mazey and Mitchell, 1993; Mazey, 1995a, 1995b; Loughlin, 1996, Hooghe and Marks, 1996 etc).

It is in the nature of the cross-border cooperation programmes of the EU, that the financial support goes to stakeholders which promote territorial cohesion and contribute towards the

reduction of disparities between the levels of development of the European Regions. We then look at how interest organizations are distributed according to the regions. Most cross-border cooperation programmes evolve around interest organizations that are based in one concrete region. We therefore expect that there will be a symmetrical distribution of interest organizations, in accordance to the regions they represent.

Case Selection And Data Collection

To assess these questions, data on interest groups are required. Here, a large data set compiled from all interest groups mobilized in Interreg Flanders-Netherlands between 2007 and 2013 is utilized. Interreg Flanders-Netherlands is one of the several cross-border cooperation programmes the European Union is running across its member states. Interreg Flanders-Netherlands Operational Programme is a good institutional venue to study, as its activities are consistently well documented, and more in particular because the European Commission is consistently engaged through monitoring their activity.¹²⁰ More concretely, an elaborated information about interest organizations' activity and their concrete project applications it is well documented, in its large part by the Office Secretariat, located in Antwerp.

The data we use, became available from the Secretariat Office of Interreg Flanders-Netherlands Programme. We conduct an in-depth exploration of all interest groups that were mobilized in the programme, through submitting a project proposal. Our investigation extends in a 6-years' time duration (2007-2013). We then constructed a data set that computes the population of all interest groups that have submitted a project proposal for this specific funding. In total, the data set comprises 835 interest groups having submitted a project proposal with regard to three programme priorities: Economy, Environment and People to People. (Insert programme themes). Our sample covers an important portion of the EU interest groups population. There is a total number of 287 project proposals that have been submitted during 2007-2013.

Calls for project proposals are routinely conducted on a broad range of issues within the cross-border topic which may include: economy, environment or people to people. The call for proposal is then launched by the team within Interreg Office, and the information is made available for all the stakeholders on the website (in practice, the information is quite accessible from the actors). The information process provides an important window into policy mobilization by groups. In total, the data set includes 835 interest organizations (institutions, interest groups, government departments/ agencies, etc.....).

But, our unit of analysis is each individual interest organization. We coded the data for all the actors that have submitted a project proposal within the previous Interreg Programme period, 2007 – 2013. As such, Individual project applications represent an excellent information-source about actors themselves, in addition to each coalition they are embedded when applying for a project proposal. Moreover, it is well documented the actor type, whether it is located in Belgium

¹²⁰ http://ec.europa.eu/regional_policy/index.cfm/en/policy/cooperation/european-territorial/cross-border/

or the Netherlands, and a short description of the project that is submitted within Interreg Flanders-Netherlands. Each of the actors was coded for: its country, region, province, when it was established, and a few other variables related to their resources (staff size, budget size, type of the actor, number of members (if any), and how many projects each of the actors has submitted within Interreg Flanders-Netherlands. However, measuring interest groups mobilization is then captured through a single dichotomous indicator that categorizes interest organizations based on whether they submitted a project proposal or not.

Most organizations we have identified have extensive web sites on which they include information about their activities. We search not only the web sites of the organizations we will interview, but also any other groups that are mentioned. Since groups may update their web pages periodically, we copy the full set of our findings. In addition to that we conduct interviews with representatives from interest groups/ stakeholders involved in Flanders-Netherlands Programme - which will provide more information on who's mobilized and why they are mobilized the decision-making bodies of the Programme - which will provide more information about the criteria of deciding whether the project is successful/ or not. Thus the interviews are fundamental for two reasons: they allow to identify a random sample of issues, and they provide with a wealth of information about strategies, activities, and arguments that we might not get in any other way.

Analysis

We start our investigation with first of all looking at the main descriptive in relation to the total population of interest groups that mobilized for the Interreg Flanders-Netherlands Programme, during 2007-2013 (Table 1). For the 6-years-time span there has been a total number of 835 interest organizations that have become active in the domain of cross-border cooperation, focusing specifically in the regions of Flanders in Belgium and the Netherlands. After completing coding and double-checking of information for all the actors, the full population of this significant portion of EU interest groups, is more than 800. This allows us to grasp the complete picture of interest representation in this domain. In overall, these organizations have worked together or alone for submitting a total of 287 project proposals under the three main programme priorities: Economy, Environment and People to People.

Table 1. Descriptive information on interest organizations for Interreg Flanders-Netherlands Programme (2007-2013)

Item	Descriptive Number
Interest Organizations	835
Project Proposals	287

From the main descriptive statistics collected with regards to interest organizations' distribution according to their type (sub-national, national, European or international) we find that most of the organizations that got mobilized for Interreg Flanders-Netherlands, are mainly focusing in working at sub-national or national levels. In table 2 below, it is made clear the frequency and distribution of interest organizations in relation to the level of their work. In total, 31.7% of organizations and other stakeholders are working at sub-national levels. In addition, 18.4% of organizations are mainly concerned with working at national levels. Less than 1% of organizations that are mobilized in our case, have a European or International background.¹²¹ Those numbers correspond to our overall expectations we stated when formulating Hypothesis 1.

Table 2. Descriptive information about interest organizations' distribution according to their type (sub-national, national, European or international).

Interest Groups - Distribution according to the Level				
	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	779	48,3	48,3	48,3
Sub-National	512	31,7	31,7	80,0
National	296	18,4	18,4	98,4
European	12	,7	,7	99,1
International	14	,9	,9	100,0
Total	1613	100,0	100,0	

We did also test the general assumption for organizations' distribution according to their geographical location. It is in the backbone feature of a cross-border cooperation programme that; interest organizations from regions alongside the territorial border of a country, will be the ones that are primarily concerned with the issue of mobilization. Belgium, is a federal country that is organized in three main regions: Flemish Region, Brussels Capital Region and the Walloon Region. As from the other side, it is mostly the south of the Netherlands that is involved with the programme.

For testing our assumption, we conducted descriptive statistics for our set of organizations according to their location. To find their exact location, we went through each individual website of the organizations and other related-stakeholders, with the main purpose of identifying where their central offices were located. This means that for all the organizations (N=835), there is a symmetrical distribution according to their location. Table 3 below, provides summarized

¹²¹ A few points for clarifications: when looking at an organizations level: national, sub-national, European or international – we opted for what is the main focus of work for the organization, not where it is located geographically. This information was mainly derived through looking at each individual website of organizations, skimming the descriptive information about what does the organization/ institution primarily do and on top of that what is the main target of their work.

information about mapping organizations in regards to office location. 26.8% of the overall organizations' population is located in Belgium, whilst 21.7% is located in the Netherlands.

Table 3. Descriptive information about interest organizations' central office location, according to the country (Belgium or Netherlands).

Interest Groups - Distribution according to Country Location				
	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	830	51,5	51,5	51,5
Belgium	432	26,8	26,8	78,2
Netherlands	350	21,7	21,7	99,9
Other	1	,1	,1	100,0
Total	1613	100,0	100,0	

For understanding what type of organizations become active in the cross-border cooperation domain and for what kind of issues, we conducted then statistical analysis. While taking a closer look at the organizations themselves, we clustered them into eight main categories: Citizen Groups, Firm, Institution, Peak Business Association, Professional Association, Public Authority, Research Institute/ University, and Sectoral Business Association while also adding the option other – in case one of the organizations does not properly fit for one of the clusters above.

Then we assessed how the type of actor (i.e organization, institution, or related) mobilizes for the main issues which are covered from the programme. From our theoretical background, we derived the hypothesis that business interests will get more mobilized for economy issues, whereas NGOs will get mobilized for environmental and societal issues. We do look closely the programme priority, under which an organization was mobilized, in order to give an approximate estimation to how the actor type is linked to the issue for which an actor mobilizes.

Contrary to our expectations, there is a negative correlation between the two variables: actor type and programme priority. We observe that the results are statistically significant. Thus, there is a significant relationship between the two variables: type of the actor and programme priority. The direction of this relationship is negative, which outlines that NGOs do not necessary mobilize for environmental and societal issues, whilst business for economic issues.

Table 4. Statistical analysis of the Type of Actor and Programme Priority

Correlations

			TYPE OF ACTOR	PROGRAM ME PRIORITY
Kendall's tau_b	TYPE OF ACTOR	Correlation	1,000	-,134*
		Coefficient		
		Sig. (2-tailed)		
		N	797	305
	PROGRAMME PRIORITY	Correlation	-,134*	1,000
		Coefficient		
		Sig. (2-tailed)		
		N	305	310
Spearman's rho	TYPE OF ACTOR	Correlation	1,000	-,134*
		Coefficient		
		Sig. (2-tailed)		
		N	797	305
	PROGRAMME PRIORITY	Correlation	-,134*	1,000
		Coefficient		
		Sig. (2-tailed)		
		N	305	310

*. Correlation is significant at the 0.05 level (2-tailed).

Conclusions

This article contributes to the overall debate over political mobilization of interest groups in particular policy fields and governance level. Following widespread policy discussions, we test a set of hypotheses that trace which actors mobilize in cross-border cooperation programme. It is not surprising that there is an equal distribution of actors, coming from different regions. This is mainly happening due to the strong emphasize of the European regions, from the European Commission.

This first exploration of the patterns of mobilization of organized interests has provided us with a full range of public policy issues and cross-border cooperation, over time. One broad research question was posed: What kind of actors get mobilized for cross-border cooperation programmes of the EU, and on top of that how does this mobilization occur. We then tested our main hypothesis using statistical methods: descriptive statistics and statistical analysis of data on the mobilization of interest groups in Interreg Flanders-Netherlands Operational Programme.

Interreg Flanders-Netherlands of course provides an ideal opportunity to test the hypotheses given the considerable densities of interest organizations. From the other side, it also provides an especially appropriate focus of the analysis since they have long been and remain the premier

organizations at both levels: national and sub-national. For understanding how interest organizations become active in the cross-border policy domain, we took a closer look to the organizations' itself, while trying to grasp the dynamics of mobilization. For these purposes, mapping of all actors, provided us with a full picture of interest organizations that participated in cross-border cooperation programme through submitting a project proposal. Mapping of the actors was conducted very carefully, in addition to sketching all relevant information as designed from the theoretical part, and hypotheses.

In the analysis, we addressed both of these concerns by developing and testing hypotheses about the type of actors that will get mobilized for this programme. As result showed, it is due to the unique nature the programme emphasized that national and sub-national organizations and stakeholders will get more mobilized, rather than European and international ones. Even though cross-border cooperation programmes constitute one of the biggest strands where support comes from the EU, as results showed – mobilization mainly occurs at sub-national and national levels.

Contrary to our expectations, there is a negative correlation between the actor type and issue for which it mobilizes. After skimming the information on all organizations and bearing on mind for which programme priorities they submit their proposals, we conclude that: Not necessarily business organizations will mobilize for economy issues, and NGOs for environmental and societal ones. There prevails a correlation between the two-variables, but as result showed, it is a negative one.

Following our assumption, that there might be an equal distribution of actors coming from both sides of the border. In our case, there is almost a perfect symmetrical distribution of interest organizations and related from regions in Belgium and also the Netherlands. This is mainly explained because of the strong regulations, cross-border cooperation programmes follow. Consequently they also require actors to pursue a strong compliance with those rules.

A broader contribution of this paper is that it aids to bridge the gap between the EU cross-border cooperation programmes, and interest groups' literature, in referring to the issue of mobilization. It shows that insights from the realm of activation in a policy domain, could apply to building patterns in cross-border cooperation programmes. Moreover, this paper also provides with robust empirical results, build-on a large-N original dataset, which makes the results even more compelling.

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Democracy and the Media

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ABSTRACT

The aim of the research paper is to get reader close to the terms of media and politics in general, and to the influence that media has in contemporary times. Globalization has become so widespread and affects all parts of our lives, no matter where we live. Western institutions impose their monetary values, political principles, models of government, tax rates and similar details. If we consider examples of Eastern influences already mentioned, we can notice that their way of advertising can not be compared with Western methods.

Political function of the media is to provide the information, to be a forum for public debate, to present different views and ideas. There is a growing number and influence of the media advisers who have changed their style and techniques of political communication (the rising cost of campaigns, soundbites, photography, celebrities, etc.) Spin doctors goal is to manage the media so as to improve the image and message of their political clients.

Internet can be defined as a complex web of global character in the service of human communication and transfer of data and information. We believe the media as a kind of authority when it comes to news, information, education and entertainment. The mass media are key forum and advertising key language. Global media are undeniable actors of the political processes, and not just as observers and mediators of information; privacy and the media are 'networked' at the global level.

Key words: Media, Politics, Democracy, Globalization, New media, Communication, Advertisement, Spin doctors, Westernization, Homogenization, Social networks, Virtual culture

Introduction

Media is one of the main actors in democracy. The political institutions and their success are strongly connected to the way they are communicating to the broader public. That means that without the good relations with the media and without creating new communication policies and strategies, they would not be able to accomplish their aims. Media, especially New media, have a great role in contemporary politics.

"Internal and external political communication channels are the nerves of government. Political system can not function without effective networks of such channels capable of transmitting political messages."¹²²

¹²² Lee Kaid, 2004

Media property, markets and policies affect the content of the news. The media, as key actors in public sphere, contribute significantly to the quality of social relations and have share in general, democratic development. At the first part of the research paper, we are going to find out more about globalization and the media, where Westernization (Western influence) and Easternization (Eastern influence) are going to be analyzed. Further on, we will focus on mass media and democracy, 'packing politics', spin doctors and main types of media democracy. After analyzing globalization and mass media in democracy, we will be able to find out more about new media (internet), virtual culture and in the end, about mass media influence towards population.

The question is how do the media function while being pressured by interests of business and politics and to what extent they manage to achieve their primary role towards public and its interest? The media's role is to be a bond between political actors and an open space for public debates that lead to the most productive policy and decision-making.

Methods and Results

For this research paper, I was using qualitative research (collecting and analyzing previous research papers, books and articles), primarily to analyze previous research statistics.

The research shows how media are affecting everyday life and to what extent do they have influence on politics in general. Its results confirm how media's role is to be a bond between political actors, and that without the influence of the media (through political communication) politics could not be successful in contemporary times.

1. Globalization and the Media

„Globalization means increased, rapidly removing barriers to movement of goods and, above all, all the factors of production (the first example in this last category is the capital) among nations-states – which happened at the end of the 20th century.“¹²³

Globalization has become so widespread and affects all parts of our lives, no matter where we live. This term has found its way from the universities, literature and social science to everyday life, street and media. It became so common that we can identify its different manifestations and types. In this part of the research I will try to analyze the two parallel relationships that can be recognized as part of globalization. One is the relationship between globalization, which comes "from above" and which comes "from below". The second analysis will be devoted to Western and Eastern influences. The second part is devoted to a more detailed analysis of the impact of media and advertising strategy in relation to globalization "from above" and the power of ordinary people and a common way of life.

¹²³Giorgio Ruffolo

Contrary to the imposition of neo-liberal political and economical order, imposed by a global elite, globalization "from below" captured overlapping policy of contestation and resistance among marginalized communities, social and labor movements and many others; global power generates global resistance. This movement is most present in the form of resentment against the institutions, in the form of youthful protest in front of the World Trade Organization. However, in this study, globalization "from below" was synonymous with opposition to globalization, national governments, international organizations, multinational corporations and technology development. Globalization "from below" will be considered as a combination of influences created in everyday life, people around the world and especially immigrants who together carry their culture in the new environment. These impacts are not supported by the powerful players of the above, but they have found a way to take root in everyday life of the modern world.

Westernization is often used as a blend of cultural imperialism, Americanization, McDonaldization and homogenization. At a rudimentary level, homogenization means that things are the same. This can be anything – politics, culture, language, products, ideology, media and entertainment. This adjustment is possible because of technology and travel. Homogenization is most evident in the spread of capitalism and neoliberal policies. In this section, westernization will not be treated as the equivalent of cultural imperialism. Cultural imperialism implies the leading role of powerful capitalist states, while other, less powerful are left on the margins of globalization, having no other role except in the acceptance of Western influence.

Globalization as a unit of cultural flows is less coherent and unitary process of cultural imperialism and the process where cultural differences and influences are moving in many different directions. Today we can talk about it in terms of Westernization; Western influences enforce their rules by multinational companies, the powerful media and entertainment industry. Although Western influences are the most obvious and they are the most discussed, we must be aware of the presence of influences coming from the East. Easternization is a very fascinating study. Not only is this a new concept, but also a whole new way of thinking about things and developing the world. While in the past six or seven centuries West controlled the political and economical world, and to some extent, culture and society, there was a time when educated and informed elite from the West criticized Western system of values. At the same time, several of them turned to the East (Eastern values and lifestyle). The lack of financial power in the East is the reason why people migrate to Western countries. They carry with them their values, culture and habits into the new environment, so oriental influences are becoming part of the West.

1.1. Western influence: The importance of advertising and social networks

Another important aspect on which we can make the difference between globalization from "above" and "below" is the question of advertising. When we talk about globalization "from above", we can notice how large organizations and corporations spend millions and millions per year for marketing purposes. A large part of their total earnings goes to the promotion of their work and products worldwide. Of course, as their products, their marketing is based on family values, allowing them to be more easily accepted by consumers. When we talk about the power

of transnational corporations, it is important to mention one thing because of people decide to buy their products – brand. In today's consumer society, the brand has become just as important as a product. Competition is greater today than in the visual identity of the price. In addition, large corporations cooperate closely in all areas, given that they have similar objectives and often cooperate with each other in order to develop a large business. In this way, not only they reduce costs, but are also associated with some "big name" that gives them greater credibility with customers. It is similar when we talk about political or social influences that are promoted through government or an international organization which is not in the interest of the profit. The goals and methods are different, but the principle is the same. These players usually promote certain values that are considered essential. In this case they usually use the campaign to raise awareness about something. For example: The European Union is spending millions of euros promoting the idea of a United Europe, a European citizen and European identity.¹²⁴ This is done in the way of sponsorship of various programs, NGOs etc. Through programs such as "Youth in Action" and "Europe for Citizens", it best promotes the European way of life and European values. European Movement, for example, that says that seeks to transform the relations between the EU Member States and their citizens in a federal European Union, received 2.5 million euros from January 2005 to October 2007. In addition, the EU funds many youth and cultural events that have to do with it that people generally understand the importance of their common European cultural and historical backgrounds. Money is being spent on conferences, workshops, exhibitions, videos and similar activities.

Here we come to another aspect of the influence of top-it's conditioning. We have many examples of how international organizations and institutions financed various projects in developing countries, but these projects have to meet organizational priorities, must represent the given values and consistent with the objectives of the organization. When it comes to economic and political cooperation, Western institutions impose their monetary values, political principles, models of government, tax rates and similar details. Even in agriculture, some countries need to change the mode of production of traditional food and drinks in order to be eligible for the European market.

1.2. Eastern influence (Power of people)

If we consider examples of Eastern influences already mentioned, we can notice that their way of advertising can not be compared with Western methods. Even if we could gather all kebab restaurants in one of the Eastern cities, their costs of advertising are difficult to reach the level of advertising costs of only one McDonald's. McDonald's can be seen on billboards, on television, in large metro stations, we see them as sponsors of events, while the advertisements for kebab restaurants are usually seen on leaflets at bus stations and sometimes in the local newspapers. This is because they rely on daily interaction with people and their presence in other people's lives. These effects were not associated with powerful corporations, political institutions and large cash sums. They can rely only on their product without any strategy or business connections. Another thing I have noticed is that the oriental influences were first accepted by

¹²⁴Thomasson-Lerulf, Philip; Kataja, Hannes 2009, The European Union's Burden, TIMBRO

the people and not from the government or some powerful organization. Since Eastern influences come mainly through food, fashion, philosophy, body and mind, it is obvious that there can not be much more to be imposed. For a simple reason: there is no concrete interest that can be drawn from these spheres. Given that there are no costs of advertising, people are the ones that incorporate these oriental models in everyday life.

2. Mass-media and Democracy

The constitutions of most countries refers to the role of the media, while no country tolerates full freedom of expression. Democracy puts considerable emphasis on communication, but the theorists of democracy poorly dealt with the principles and practices of actions of mass-media. Countries have developed systems of regulation, but they are different. Liberal democracy means free, but responsible press. The role of government is limited due respect for personal liberty (which is defined as the absence of constraint). Important politics issues should be resolved by voting and the government should respect the collective decision of the citizens. Political function of the media is to provide the information, to be a forum for public debate, to present different views and ideas. Realization of this ideal is the free press, which is a medium that allows the diversity of ideas and opinions. Technology has enabled mass production, a large increase circulation, the mass readership and popular press. Digital technology completed the problem of scarcity of resources and state borders have become more porous, and heavier regulation. Nowadays, globalization and liberalization of prices are seeking freelance journalism – the Internet has become its symbol. Third factor that makes the context for the emergence of free journalism politics is industrialization. This could have a negative effect on democracy in a way that media may misrepresent the people, it may incorrectly inform the people (and this can result misunderstood political acts). Therefore, important criteria are accuracy and authenticity. Freedom of expression justifies private property, but it is detrimental to the healthy mass communication. The second type of media democracy is direct democracy, which means tighter regulation of the media in which there is some form of public control. Direct democracy tends to collective realization of the common good. To avoid the dominance of propaganda, the discursive role of the media should be emphasized and it is also expected that subsidies and regulation allow the emergence of relatively independent media. The revised version of democracy is called associative democracy because the emphasis is on the transfer of power to independent associations, while information and communication become key phrases. Deliberative democracy emphasizes the conditions that allow people to jointly reflect on issues of public policy, and the implications for the mass media in that country allow or facilitate independent media ventures.

2.1. "Packing politics" and "Spin doctors"

"Packing politics" refers to the idea that political actors increasingly manage and control the public image of politics. There is a growing number and influence of the media advisers who have changed their style and techniques of political communication (the rising cost of campaigns, soundbites, photography, celebrities, etc.) Policy is transformed (modernized) and the result of these changes is an electronic community or new political culture. The positive thing

is that it is an attempt to re-establish relations between politicians and voters or adapting policies to new forms of communication. Rules and conventions of the interview are changing – politicians are less careful and journalists are more intrusive. Politicians use sound clips and reduced communication in form of public relations, offering no responsibility than phrases, trivial amounts of data in a non-political broadcasts. Process of creating the image began appearance and dress, continued through the organization of party meetings and conferences – political advertising increasingly mimic the practices of commercial advertising.

Spin Doctors are media consultants and advertisers. Their goal is to manage the media so as to improve the image and message of their political clients. Spin doctors are creating opportunities for photographing, managing interviews, writing speeches and press releases, devising soundbeats for the campaigns, etc.

3 . New media (internet) and virtual culture

Many studies of new media and virtual culture focus on their social, economic and political dimensions. New media are different forms of interactive media that is characterized by non-linear access to the content of documents, interactivity and multimedia presentation mode. Virtual culture includes ways in which different cultural facilities and attractions present information (screens in airports and train stations, traffic signs, graphic prospects, television news, the odds of books, newspapers and magazines, interior design of banks, hotels and other commercial premises, connecting planes and cars and finally, connect the computer operating system with software applications). Information, as well as virtual culture, includes historical methods for organizing and obtaining information (analogue iconography), as well as forms of user interaction with information objects and displays.

In the world of new media, the boundaries between art and design is unclear. Many artists make a living designing advertisements, and professional designers usually those new media support in dealing with systemic experiments, creating new standards and conventions. Many projects of new media are made by large teams of people, and many media items (games, software applications) have been sold in millions of copies. Each item of new media (web sites, computer games, digital image) is a kind of "external recommendations". Specifically, it is a physically existing case, the historical information presented in other documents, the system of categories pertaining to culture as a whole or of some social groups and interests. Representative of the new media represent some features of physical reality, a vision of the world, one possible system category among many others.

A popular definition of new media equates them with using computers for distribution and exhibition, not production. This definition is in some sense restrictive. The new media represent the convergence of two separate historical movements – computer and media technologies, both of which started operations in the not so recent past. Modern digital computers are developed for efficient execution of the budget figures. In parallel, we are witnessing the growth of modern media technologies that enable storage of pictures, sounds and text using a variety of materials (photographic plates, stocks of films, records, etc.). The unification of these two histories is the translation of all existing media into numerical data that are available for computers. Internet,

which can be seen as a massive, distributed, media database, distilled the basic requirement of the new information society – a superabundance of information of all kinds. It can be defined as a complex web of global character in the service of human communication and transfer of data and information. It was created by merging the achievements of information technology, telecommunications and audio-visual media, and relies on existing infrastructure (target medium). Properties of the Internet as a new medium would be global availability, multimedia, hypertext, communicability, simplicity, limitlessness and equality. The key difference between traditional mass media and the Internet is that the Internet is not broadcasting media, such as print, radio and television, in which the submission of information does not flow in only one direction. Internet is a medium of interaction. This difference makes him the new medium, but also supplement to the traditional mass media.

4. Mass media towards population in general (influence)

Nowadays, almost every individual depends on information and communication, in order to maintain their lives in daily activities (work, education, health care, travel, personal relationships and other matters in which we are involved). It is no longer unusual to wake up, check to see if we have unread messages or notifications to mobile devices, watch TV or newspapers to find out the latest news, read emails, make some calls, eat with family and friends and make decisions based on the information collect from these means of communication of mass media. You should be aware that the values we hold, beliefs that we "bear" and the decisions we make, are related to our assumptions, experiences, education and those facts that we are sure of. We rely on the mass media when it comes to current news and facts about what is important and what should be taken into account. We believe the media as a kind of authority when it comes to news, information, education and entertainment. Here is manifested their great impact.

"You don't have any other society where the educated classes are so effectively indoctrinated and controlled by a subtle propaganda system – a private system including media, intellectual opinion forming magazines and the participation of the most highly educated sections of the population. Such people ought to be referred to as "Commissars" – for that is what their essential function is – to set up and maintain a system of doctrines and beliefs which will undermine independent thought and prevent a proper understanding and analysis of national and global institutions, issues, and policies."¹²⁵

Conclusion

Westernization has become so strong that it can be a weakness. On the other hand, Eastern influences are still not so widespread and affirmed to pose a threat to local culture or to cause resistance in humans. This means that lack of strength can actually strengthen Easternization. Further, there is a difference in which these effects are present. As already mentioned several times, oriental influences are strongest in areas that affect the everyday lives and in spheres which by nature do not cause much controversy or leave room for a huge riot. Unlike western

¹²⁵Chomsky, Noam 1988, Language and Politics, Black Rose Books, New York

influences that are noticeable in politics and economics, are the most competitive arenas in the world.

Considering media, there is a structural contradiction between the freedom of communication and unrestricted freedom of the market. The regulation of property rights is necessary in order for the media to fulfill their democratic role. In everyday life we are constantly censoring each other and every aspect of life. The problem of freedom of expression is that it protects the individual's right to say whatever he wants, but not those who listen - to be protected. Speech is an integral part of establishing identity – it is more than opinions, it has the potential to create or damage identities and therefore it should be limited. Politics and mass media should not be considered as two separate entities, but as one part of the complex relationship, called 'Mass Media Policy'.

If democracy is government of the people, then the ability of people to make judgments about politicians and their activities is extremely important. There is a pressure on the parties to adopt new techniques of political communication, which can be seen in the logic of rational action. Voters have little incentive to study manifestos or speeches of politicians and therefore rely on free information and image of the overview of the main political views. The mass media are key forum and advertising key language. Mass media mediate, modify and transmit political ideas, but also enhance the personalization of politics. Mass communication is organized around advertising, the public is now the market, the media turns citizens into consumers. Recipients ratings are very important for the money, revenue and profit realized by media companies. Commercial media are selling advertising space or time for companies with products or services for sale. To do that, they have to explain to potential advertisers that their messages can be live (on air), or printed on the screen to be seen and heard by a large number of consumers.

The media shape public opinion in different forms, and political advertising is mainly used for that. Global media are undeniable actors of the political processes, and not just as observers and mediators of information; privacy and the media are 'networked' at the global level.

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Part III

English Language and Literature

Learning Styles Preferences of Freshman Students at IUS

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ABSTRACT

Learning is a progress of transferring information and experience into knowledge, skills, behaviors and attitudes to others. Learning does not happen accidentally or by itself. It is developed and formed by our existing knowledge. Students practice their learning styles in relation to formal learning. Formal learning has a role in creating relationships between the instructor and the learner at schools. Educational researchers have proposed many different methods of learning in order to accommodate different student's learning styles. The first aim of this study is to identify the perceptual learning styles preferences of freshman students at IUS. The second aim is to determine differences in learning style according to gender and nationality. There were twenty four students (N=24) who took part in this research. Survey questionnaire was adopted from Joy Reid's for this research. *Perceptual Learning Styles Preferences Questionnaire* (1987) contains 30 questions on 5 different learning styles (Kinesthetic, Auditory, Visual, Individual and Group). For the data analysis *SPSS version 16* was used in order to analyze data using quantitative research methodology. Results revealed that the students' preferred learning style was Kinesthetic. They expressed minor preference for, Auditory and Group Learning, while on the other hand students expressed negative preference towards Visual Learning Style.

Key words: Learning styles, Learning Preferences, Students, Lecturers, Learning Styles Inventory.

Introduction

There are many different definitions of learning but I will only mention few of them. Obralic&Akbarov (2012) cited Illeris, 2004 & Omrod, 1995 " Learning is commonly defined as a process that brings together cognitive, emotional and environmental influences and experiences for acquiring, enhancing or making changes in someone's knowledge, skills, values and world views (p.1). Learning is "the process whereby knowledge is created through the transformation of experience" (Kolb, p.38). In addition, it also means it is a progress of transferring information and experience into knowledge, skills, behaviours and attitudes for others. Learning has not happened as natural by itself. It is developed and formed by our existing knowledge (Definitions for Learning, p.2). People learn through as part of their education, individual progression, schooling or training (Definitions for Learning, p.2). Learning is caused by learning styles. Learning styles consider to students or the learner's different views of learning and their way to practice it at schools or outside of schools. "Learning style can also be described as a set of factors, behaviours, and attitudes that facilitate learning for an individual in

a given situation'' (What are Learning Styles?, p.1). Students practice their learning styles in relation to formal learning. Formal learning has a role on creating relationship between the instructor and the learner at schools (Learning-Wikipedia, p.6). In relation, teachers should be classified their students learning styles in order to match their right teaching styles for their students in classrooms. As a result, teachers teach better and students learn better to achieve their successful results from assignments or exams.

Educational researchers have progressed many methods to link in students learning styles (Obralic & Akbarov, p.1). In relation, these methods are very helpful to describe visual, kinaesthetic, auditory, tactile, group and personal styles as well as many other categories of styles in learners. They are also searching them with the purpose of developing the learning and teaching procedures. For this reason, it is clear that students learn in different kinds of learning terms. For instance, students who learn especially with their eyes are called visual learners, those who learn with the ears are called auditory learners. Some students who choose to learn by experience or by hands-on tasks are called kinaesthetic or tactile learners.

In addition, some students learn better when they study alone whereas the other students learn better when they study in groups (Obralic & Akbarov, p.1).

Although there are some studies about students learning styles preferences in USA, Asia and in Europe, this kind of educational theory based research has not done for many times in Bosnia and Herzegovina. Therefore, this quantitative research study identifies that there might be mismatch between freshman students preference on perceptual learning styles preferences while they are learning English as their second language at International University of Sarajevo.

The purpose of this study is to identify the perceptual learning styles preferences of freshman students relate to their gender (male&female), nationality (Bosnian&Turkish) and age differences (18-22) at International University of Sarajevo.

Theoretical Framework:

The learning styles are not a new concept and they come from the ancient times. The earliest learning styles belong to 334 BC when Aristotle said that '' each child are possessed specific talents and skills'' (What are Learning Styles?, p.1). He also realized each child have personal differences against each other. There were many educational researches who practiced on learning styles research results at schools in 1900s (What are Learning Styles?, p.1). Therefore, it is first essential to analyze the previous learning theories. There are three types of learning theories which come from the last half of the 1900s through 21st century. And those three types of learning theories are called behaviourism, cognitivism and constructivism. Behaviorism concentrates just on observable ways of learning. Cognitive theories relates to behaviour on mental learning and Constructivism is seen learning as the learner creates new ideas or thoughts (Obralic & Akbarov, p.32).

Behavioural theory is founded by B.F. Skinner in 1980.'' It deals with the observable changes in behaviours and the reinforcement of such desired behaviours'' (Mulalic, Shah & Ahmad, p.11-12). Skinner called his experimental study of behaviour as radical behaviorism (B.F. Skinner-

Wikipedia, p.3). Behaviorism is the combination of three aspects which are philosophy, psychology and theory (Behaviorism, p.1). Reinforcement is the main structure of

Behaviorism. It forms and controls behaviour either positively or negatively (B.F. Skinner, p.4). "Positive reinforcement strengthens a behaviour by providing a consequence an individual finds rewarding" (McLeod, p.6). For example, if the teacher gives his or her student 5 pounds in cash as rewards for every time, his or her student do their homework. Students then do the same behaviour over and over again for every time if their teacher keep giving them the money in cash. Negative reinforcement also strengthens a behaviour because it ends unsatisfied action. For instance, if the student does not done with his or her homework, the student then gives 5 pounds to his or her teacher. The student tries to be done with his or her homework in order to be not giving 5 pounds to the teacher (McLeod, p.7). Students learn at their best level when they are gifted such right responses and those responses are known as operant conditioning (Mulalic, Shah & Ahmad, p.11). For instance, the instructor rewards points to his or her students who mostly keep themselves quiet and behave politely at school. In relation, students notice that as they keep themselves more quiet and behave more politely, then they are rewarded more points from their school instructor (Operant Conditioning (Skinner), p.1).

Cognitivism is founded by Jean Piaget in 1971 (Obralic & Akbarov, p.32). It is a theory about how human's IQ is progressed naturally (Paiget's theory of cognitive development-Wikipedia, p.1). Jean Piaget believed that the important and active role of development on intelligence has come from the childhood when the child learns and explores it. Although, he did not mean to relate his theory to education, educational researchers have proved that how Jean Piaget's intelligence development theory can be also used both on teaching and learning (McLeod, p.9). However, children should not be taught certain methodologies until their intelligence is improved at a certain level (McLeod, p.10). Learning should be based on student centred approach rather than teacher centered approach. In relation, the instructor role is a facilitator rather than being a formal authority. Jean Piaget's changed people's thoughts on child's world and their strategies about studying children. McLeod (2015) cited Discovery Learning "His ideas have been of practical use in understanding and communicating with children particularly in the field of education" (p.10).

Constructivism is a study of knowledge about people who explore knowledge and meaning in relation to their experiences and their concepts

(Constructivism (philosophy of education) Wikipedia, p.1). There was a connection between people's experiences and their patterns of behaviour which Piaget called these knowledge systems as schemata. Jean Piaget's constructivist learning has had an important role on learning studies and teaching styles in education and it has an important impact on many educational reform stages (Constructivism (philosophy of education), Wikipedia, p.1). In contrast to Jean Piaget's cognitive development on children, Vygotsky believed that social learning relates to child development. Vygotsky's theory is based on student centered approach as students play the main role in learning. For this reason, teachers and students roles are changable with each other. "Learning therefore becomes a reiprocal experience for the students and teacher" (Social

Development Theory (Vygotsky)/Learning Theories, p.2). Learning, instruction and development are the only positive aspects of instruction. They are related to intelligence development. Instructors should use teaching resources, worksheets, lesson plans and rubrics in order to help their learner's development and measure as the children continue to develop their problem solving skills individually (Vygotsky's Theory on Constructivism, p.3-4).

Review of Literature:

The previous learning theories were more developed and expanded from other learning theorists in 20th century. There are four well known learning styles models and those are David Kolb's learning style model (1984), Rita and Kenneth Dunn learning style model (1993), Anthony Gregor's learning style model (1984) and Joy Reid's perceptual learning style preference model (1995). David Kolb's Learning Style Model is related to a concept which learners use four types of learning categories. Those learning categories are concrete experience (feeling), reflective observation (watching), abstract conceptualization (thinking), and active experimentation (doing) (Reynolds & Gerstein, p.123). The involvement of concrete experience and abstract conceptualization and active experimentation and reflective observation create the four types of learning preference models such as diverger, assimilator, converger and accommodator. In relation, David Kolb invented Learning Style Inventory (LSI) in order to describe those four learning preference models individually (Reynolds & Gerstein, p.124). Divergers learning preferences are feeling and watching. Assimilators learning preferences are thinking and watching. Convergers learning preferences are thinking and doing. And accommodators learning preferences are feeling and doing (Brock & Cameron, p.252). Brock & Cameron, (1999) cited Bonwell (1992/93) and Eison (1991) "Learning is not a spectator sport. Students do not learn much sitting in class listening to teachers, memorizing prepackaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to past experiences, apply it to their daily lives. They must make what they learn part of themselves" (p.254). In relation, Kolb's learning styles model is the right instrument in order to encourage students to develop their learning activities on reading, listening, seeing, talking and doing (Brock & Cameron, p.254).

Rita and Kenneth Dunn learning styles models relate to twenty one levels and those levels are divided into five groups which influence student's learning styles. Those five groups of studies were environmental, emotional, sociological, physical and psychological (Vaseghi, Ramezani & Gholami, p.442). The environmental group is based on sound, light, temperature and design when students learn their subjects. For instance, some students prefer to learn in a quiet area whereas some other students prefer to learn while they are listening to a music. The emotional group is based on motivation, persistence, responsibility and structure elements. Students have different concentrational stages and they concentrate different than each others. "For instance, teachers could exactly tell what they expected of highly motivated learners to learn and what the available resources were" (Vaseghi, Ramezani & Gholami, p.442). On the other hand, instructors preferred to handle short essays to teach their students who were less motivated than other students. Sociological group is based on peers, self, pairs and teams. Some students are favoured in group learning while some others are favoured by learning alone. The physical group

is based on perception, intake, time, and mobility. For instance, students learn either they are good at listening, reading, physical activity or at hands on tasks. And psychological group is based on analytical learning against global learning, right brain against left brain and reflective against impulsive elements.”For example, global learners preferred to see the overall picture before they learned, whereas analytic learners could learn step by step without seeing the overall picture” (Vaseghi, Ramezani & Gholami, p.442).

Anthony Gregorc’s model is a study of perceptions and these perceptions are based on our particular learning qualities or learning methods (Learning styles-Wikipedia, p.4).

There are two perceptions which are called concrete and abstract and two ordering abilities which are called random and sequential in Gregorc’s learning styles model. “Concrete perceptions involve registering information through the five senses, while abstract perceptions involve the understanding of ideas, qualities, and concepts which cannot be seen (Learning styles-Wikipedia, p.4). “In regard to the two ordering abilities, sequential involves the organization of information in a linear, logical way and random involves the organization of information in chunks and in no specific order” (Learning styles-Wikipedia, p.3-4). Perceptual qualities and ordering abilities have four combinations which are called concrete sequential, abstract random, abstract sequential and concrete random with themselves. Learners who have different combinations learn in different manners. “They have different strengths, different things make sense to them, different things are difficult for them, and they ask different questions throughout the learning process” (Learning styles-Wikipedia, p.5).

Joy Reid is the founder of perceptual learning style preference model. In relation, she has invented an instrument called Perceptual Learning Style Preference Questionnaire (PLSPQ) for learners who learn at their best by choosing their favourite learning style models such as visual, auditory, kinesthetic, tactile, group and individual when they learn their foreign languages (Karthigeyan, K & Nirmala, K, p.135). Auditory learners prefer to learn by listening tapes and lectures, visual learners prefer to learn by reading and studying charts, kinesthetic learners prefer to learn by physical activity and movement, tactile learners prefer to learn by hands on tasks and laboratory experiments and group learners prefer to study with their classmates in group while the individual learner prefers to learn alone (Vaseghi, Ramezani & Gholami, p.442).

Background Studies:

Joy Reid’s perceptual learning style was used on the learning style preferences of ESL students in the United States of America. There were participants who had 29 different majors, 52 language backgrounds from 98 countries participated in Reid’s perceptual learning styles preferences. In addition, there were also 154 both graduate and undergraduate native English speakers from Colorado State University participated to finish Reid’s questionnaire survey as volunteers (Reid, p.92). The result of Reid’s perceptual learning styles study

proved that ESL students mostly preferred kinesthetic and tactile learning methods. Graduate students more preferred for visual and tactile learning styles than undergraduates “ $F(1,1230) = 29.520, p = .000$, and $F(1, 1210) = 23.065, p = .0000$ ” (Reid, 1987, p.93). The undergraduate students were more auditory than graduate students, “ $F(1, 1225) = 7.147, p = .0076$ ” (Reid, 1987, p.94). Both graduate and undergraduate students mostly preferred kinesthetically and tactile learning styles. And male students preferred visual and tactile learning styles more than female students in gender. “ $F(1, 1281) = 4.144, p = .0420$, and $F(1, 1260) = 5.665, p = .0175$ ” (Reid, p.93).

Students who have different majors proved that they have different preferred learning styles. Students who were majored in hard sciences chose visual learning as their major learning styles whereas students who were majored in humanities chose visual learning as their least learning styles (Reid, p.94). Students who were majored in computer science, hard sciences, business and medicine preferred auditory learning as their major learning styles. Students who were majored in engineering and computer science more tactile than humanities majors. Beside all other majors, students who were majored in hard sciences also showed that individual learning style was the least preferred learning style.

Students who had been living in the United States for more than three years were preferred auditory as their learning methods more than those who had been living in the United States for less than three years “Scheffe test, $p > .05$ ” (Reid, p.95). In addition, students who had been studying English for more than three years in the United States less preferred visual, kinesthetic and group studies than all other participants (Reid, p.95). Moreover, students who had been studying for more than three years in the United States were less preferred on tactile learning style than students who had been studying English for less than three years in the United States (Reid, p.96).

There were nine languages included English were analyzed to identify that Korean students were more visual learners than American and Japanese students “Scheffe test, $p > .05$ ”. Arabic and Chinese students were also major visual learners and native English speakers were minor visual learners (Reid, p.96).

Japanese speakers were less auditory learners than Arabic and Chinese speakers “Scheffe test, $p > .05$ ” Korean, Indonesian, and English speakers were major auditory learners while Thai, Malay, and Spanish students were minor auditory learners (Reid, p.97). Japanese speakers were less preferred kinesthetic learning style than Arabic, Spanish, Chinese, Korean, and Thai speakers “Scheffe test, $p > .05$ ”. Although, the native English speakers were seen the kinesthetic learning style as their second lowest preference, the university students from the United States were seen Kinesthetic learning style as their major preference (Reid, p.97).

English native speakers were less preferred tactile learning style than all NNS language backgrounds. And they were less preferred tactile learning style than Arabic, Chinese, Korean, and Spanish speakers “Scheffe test, $p > .05$ ” (Reid, p.97). English speakers were seen group working less than other language groups. “And they were significantly lower than Malay speakers” “Scheffe test, $p > .05$ ” (Reid, p.98). Although the rest of the other language groups

were seen the individual learning as their major preferences learning style, English speakers were chosen the individual learning as their major preference learning style. However, Malay speakers who were seen group learning as their highest preference, they were seen the individual learning as their least preference in comparison to all other nine language backgrounds.

In ESL learning style preferences, Arabic, Chinese, and Korean students have more major learning style preferences whereas Japanese speakers shows a single major learning style. However, Spanish speakers preferred kinesthetic and tactile as their stronger learning methods, group learning as their negative style, visual, auditory and individual learning as their minor learning methods. In addition, Malay and Thai speakers seem to have close learning methods with each other. Moreover, Malay and Arabic speakers were seen group learning as their minor learning methods. Finally, Indonesian speakers were the most closest group to native English speakers who were also seeing auditory and kinesthetic as their major learning methods, group learning as their negative method, visual, tactile and individual learning as their minor methods (Reid, p.98-99).

Joy Reid's perceptual learning styles preferences also took place at Tarbiat Moallem University. Reid's perceptual learning styles preferences used for vocabulary learning strategies. The participants were 54 EFL male and female students who were aged between 20 to 22 years old and they were majoring in English literature (Zokae, Zaferaniah & Naseri, p.140). Reid's questionnaire included five classifications which were Determination, Social Memory, Cognitive and Metacognitive strategies. The survey identified metacognitive strategies were the most preferred strategy with a mean score of 3.1380. Determination strategies were the second most preferred strategies with a mean score of 3.0000. Cognitive strategies were ranked as the third most preferred strategies with a mean score of 2.8677. Memory was the fourth most preferred strategies with a mean score of 2.7847 and social was the fifth and the last most preferred strategies with a mean score of 2.2259 (Zokae, Zaferaniah & Nasei, p.140).

The Independent samples t-test results proved that there was no significant difference between the vocabulary strategy preferences of males and females in gender. Because the significant value is more than $p > .05$ (Zokae, Zaferaniah & Nasei, p.140).

The descriptive studies showed that the results of the most preferred learning style was visual style with a mean score of 37.6296. Kinesthetic was the second most preferred learning style with a mean score of 36.4815. Auditory was the third most preferred learning style with a mean score of 36.1111. Tactile was the fourth most preferred learning style with a mean score of 33.6667. Individual was the fifth most preferred learning style with a mean score of 17.4074 and group was the sixth and the least preferred learning style with a mean score of 16.0741 (Zokae, Zaferaniah & Nasei, p.141).

The Independent Samples t-test also indicated that there was no significant difference in perceptual learning preferences of females and males (Zokae, Zaferaniah & Nasei, p.141).

The results of analyzed relationship between learning styles and learning strategies indicated that auditory significantly in relationship with social ($p=0.019$) and cognitive ($p=0.023$) vocabulary

learning strategies. In addition, there was significant relationship between group learning style and social vocabulary learning strategies ($p=0.020$). Moreover, the result was also proved that there was relationship between kinesthetic learning style and social vocabulary strategies ($p=0.025$) (Zokaee, Zaferaniah & Nasei, p.142).

Methodology:

Statement of the problem

The purpose of this research is about identifying the problem between learning styles on students preferences. There is sometimes problem about misunderstanding students preferred learning styles when the teachers want to teach their subjects in classrooms. Teachers think they can use their same teaching method to all their students but they don't think that their students have their own preferred learning styles. Teachers actually forget that they also used to be students like their students in past. If teachers find out about their students preferred learning styles individually, their students attend to their classes regularly, complete their assignments on time and they get high results from exams too. In addition, teachers could also be seen as their favourite teacher.

Research objectives:

The main objective of this research is to determine the freshman students learning styles based on their gender, nationality and age differences at International University of Sarajevo. For this reason, it is important to identify students learning preferences in details. The participation of new concepts about students and their learning styles will change the teacher's methods within the whole educational system. In this way, teachers could be satisfied about teaching courses to their students by using their right teaching methods.

Research Design:

The quantitative methodology was used in Reid's perceptual learning styles questionnaire survey. The survey was aimed to collect some demographic information such as age, gender, level and nationality of freshman students. The participants answered the questions either they agree or disagree with each given statement on a 5 point Likert Scale.

Subjects:

Subjects of this research included freshman students at International University of Sarajevo. The focus group is divided in 24 males and females who come from both Turkey and Bosnia and Herzegovina. Their age groups are between 18 to 22 years old. 20 freshman students are from Bosnia and Herzegovina whereas 4 freshman students are from Turkey.

Research Questions:

The purpose of this research study is to identify:

1. What are the freshman students perceptual learning styles at IUS?

2. Is there any difference in perceptual learning styles preferences among male and female freshman students?
3. Is there any difference in perceptual learning styles preferences among Turkish and Bosnian freshman students?
4. Is there any difference in perceptual learning styles preferences among Turkish and Bosnian freshman students according to their age differences?

Hypotheses:

1. There is no difference between male and female freshman students on perceptual learning styles preferences.
2. There is no difference between Turkish and Bosnian freshman students on perceptual learning styles preferences.
3. There is no difference in age groups of Turkish and Bosnian freshman students on perceptual learning styles preferences.

Instruments:

Joy Reid's perceptual learning style preference questionnaire (PLSPQ, 1987) has 30 questions. It has divided in five sections which relate to how students learn best using their perceptions on visual, auditory, kinesthetic and tactile learning styles preferences as well as group and individual learning styles preferences. There are 6 Auditory, 8 Kinesthetic, 5 Group, 5 Visual and 6 Individual learning styles preferences questions in Reid's questionnaire survey. Likert scales statements are ranged from (5) strongly agree, (4) agree, (3) undecided, (2) disagree and (1) strongly disagree.

Procedures:

This research survey is carried out at a private higher educational institution called International University of Sarajevo. It is located in Ilidza, Sarajevo. The research survey consider the first session of the spring semester 2015/2016. The participants of freshman students from IUS were handled Reid's perceptual learning style questionnaire which has 30 statements. The participants are also going to be informed about the purpose of the Reid's learning preference survey and what comes out as the results of that research survey too.

Data Analysis

Joy Reid's perceptual learning style preferences questionnaire survey was adapted in this statistical analysis. The freshman students of IUS answered the questionnaire survey about how

they prefer to learn best in the classroom. They answered the 30 statements on a 5 point likert scale from each one of Reid`s five perceptual learning style preferences. Their answers were statistically analyzed by Statistical Package for Social Sciences. The SPSS 16th edition was used as the descriptive statistical method in data analysis. In frequencies section, the numbers of participants included percentencies were found on their gender, age and nationality groups. T-test data analysis method of group statistics were found the most and the least preferred learning style mean scores between male and female freshman students. The Independent Samples Test was identified whether there is significant 2 tailed difference or no significant 2 tailed difference between Reid`s five perceptual learning styles preferences in gender. T-test data analysis method of group statistics were also found the most and the least preferred learning style mean scores according to freshman students age differences. In relation, the Independent Samples Test was also identified whether there is significant 2 tailed difference or no significant 2 tailed difference between the five perceptual learning styles preferences in age groups. In addition, T-test data analysis method of groups statistics were concerned the most and the least preferred learning style mean scores between Bosnian and Turkish freshman students. Moreover, the Independent Samples Test was identified whether there is significant 2 tailed difference or no significant 2 tailed difference between Joy Reid`s five perceptual learning style preferences in nationalities. In conclusion, the descriptive statistical method of data analysis results successfully answer the research questions and respond whether the null hypothesis are correct or incorrect in this current study.

DEMMOGRAPHIC DATA

(STATISTICS)

GENDER

N	Valid	24
	Missing	0
Mean		1,50
Std. Deviation		,511
Minimum		1
Maximum		2

In demmographic data as it seen above, it statistically shows that there were 24 numbers of total freshman students according to their gender who returned the completed Reid`s perceptual learning style preferences questionnaire survey.

GENDER

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid male	12	50,0	50,0	50,0
female	12	50,0	50,0	100,0
Total	24	100,0	100,0	

The gender data analysis table above shows that there were 12 males in 50% and 12 females in 50% attended as participants based on their gender in the questionnaire survey.

In total, there were 24 males&females freshman students in 100% participated as participants according to their gender in the questionnaire survey.

DEMMOGRAPHIC DATA

(STATISTICS)

AGE

N	Valid	24
	Missing	0
Mean		1,17
Std. Deviation		,381
Minimum		1
Maximum		2

In demmographic data as it seen above, it statistically shows there were 24 numbers of total freshman students according to their age who returned the completed Reid`s perceptual learning style preferences questionnaire survey.

AGE

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid 18-20	20	83,3	83,3	83,3
21-22	4	16,7	16,7	100,0
Total	24	100,0	100,0	

The age data analysis table above shows that there were 20 freshman students who are aged between 18-20 in 83,3% and 4 freshman students who are aged between 21-22 in 16,7% attended as participants based on their age groups in the questionnaire survey.

In total, there were 24 males&females freshman students in 100% participated as participants according to their age groups in the questionnaire survey.

DEMMOGRAPHIC DATA (STATISTICS)

NATIONALITY

N	Valid	24
	Missing	0
Mean		1,17
Std. Deviation		,381
Minimum		1
Maximum		2

In demmographic data as it seen above, it statistically shows that there were 24 numbers of total freshman students according to their nationality who returned the completed Reid`s perceptual learning style preferences questionnaire survey.

NATIONALITY

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Bosnian	20	83,3	83,3	83,3
Turkish	4	16,7	16,7	100,0
Total	24	100,0	100,0	

The nationality data analysis table above shows that there were 20 Bosnian freshman students in 83,3% and 4 Turkish freshman students in 16,7% attended as participants based on their nationalities in the questionnaire survey.

In total, there were 24 Bosnian and Turkish freshman students in 100% participated as participants according to their nationalities in the questionnaire survey.

T-TEST

(GROUP STATISTICS)

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Auditory	male	12	15,58	2,539	,733
	female	12	14,00	2,796	,807
Kinesthetic	male	12	20,25	6,326	1,826
	female	12	19,42	4,641	1,340
Group	male	12	14,00	4,348	1,255
	female	12	14,00	3,766	1,087
Visual	male	12	12,58	3,260	,941
	female	12	12,25	1,545	,446
Individual	male	12	14,25	3,279	,946
	female	12	14,00	2,985	,862

The results of the T-test table above shows that there is no difference between the mean scores of both male&female freshman students on Reid`s perceptual learning style preferences. It confirms our null hypothesis that there is no differences between male&female freshman students on their preceptual learning style preferences. It also shows the results of the descriptive statistics indicated that the males most preferred learning style is Kinesthetic with a mean score of 20,25. Auditory is the males second preferred learning style with a mean score of 15,58. Individual is the males third preferred learning style with a mean score of 14,25. Group is the males fourth preferred learning style with a mean score of 14,00 and visual is the males least preferred learning style with a mean score of 12,58. In comparison, the results of the descriptive statistics indicated that the females most preferred learning style is also Kinesthetic with a mean score of 19,42. Auditory is the females second preferred learning style with a mean score of 14,00. Individual is the females third preferred learning style with a mean score of 14,00. Group is the females fourth preferred learning style with the same meaning score of auditory and individual`s which is 14,00. And visual is the females least preferred learning style with a mean score of 12,25.

INDEPENDENT SAMPLES TEST

	Levene`s Test for Equality of Variances		t-test for equality of means					95% Confidence Interval of the Difference	
	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Auditory	,569	,459	,426	22	,674	,650	1,525	-2,513	3,813
			,344	3,672	,750	,650	1,891	-4,790	6,090
Kinesthetic	,267	,611	-,972	22	,342	-2,900	2,985	-9,090	3,290
			-,802	3,722	,471	-2,900	3,616	-13,244	7,444
Group	4,767	,040	-,405	22	,689	-,900	2,220	-5,503	3,703
			-,273	3,378	,801	-,900	3,295	-10,753	8,953
Visual	9,391	,006	-,947	22	,354	-1,300	1,373	-4,147	1,547
			-,489	3,127	,657	-1,300	2,657	-9,566	6,966
Individual	0,13	,911	-,981	22,	,337	-1,650	1,682	-5,139	1,839
			-,971	4,255	,383	-1,650	1,699	-6,258	2,958

The result of the Independent Samples Test shows that there is no significant (2-tailed) value $\alpha < 0,05$ between five learning styles preferences.

Therefore, we can confirm that our null hypothesis is correct to find that there is no difference between Turkish and Bosnian freshman students on their learning style preferences according to their gender.

T-TEST

(Group Statistics)

	Age	N	Mean	Std. Deviation	Std. Error Mean
Auditory	18-20	20	15,20	2,745	,614
	21-22	4	12,75	1,780	,854
Kinesthetic	18-20	20	20,10	5,875	1,314
	21-22	4	18,50	2,380	1,190
Group	18-20	20	14,30	3,975	,889
	21-22	4	12,50	4,203	2,102
Visual	18-20	20	12,80	2,462	,551
	21-22	4	10,50	1,915	,957
Individual	18-20	20	14,15	3,360	,751
	21-22	4	14,00	,816	,408

The results of the T-test table above shows that there is no difference between the mean scores of age groups on Reid's perceptual learning style preferences. For this reason, it confirms our null hypothesis that there is no differences of age groups between male&female freshman students on their preceptual learning style preferences. It also shows the results of the descriptive statistics indicated that 18-20 years of age groups most preferred learning style is Kinesthetic with a mean score of 20,10. Auditory is the 18-20 years of age groups second preferred learning style with a mean score of 15,20. Group is the 18-20 years of age groups third preferred learning style with a mean score of 14,30. Individual is the 18-20 years of age groups fourth preferred learning style with a mean score of 14,15 and visual is the 18-20 years of age groups least preferred learning style with a mean score of 12,80. In comparison, the results of the descriptive statistics indicated that the 21-22 years of age groups most preferred learning style is also Kinesthetic with a mean score of 18,50. Individual is the 21-22 years of age groups second preferred learning style with a mean score of 14,00. Auditory is the 21-22 years of age groups third preferred learning style

with a mean score of 12,75. Group is the 21-22 years of age groups fourth preferred learning style with the meaning score of 12,50. And visual is the 21-22 years of age groups least preferred learning style with a mean score of 10,50.

INDEPENDENT SAMPLES TEST

	Levene`s Test for Equality of Variances		t-test for equality of means					95% Confidence Interval of the Difference	
	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Auditory	1,187	,288	1,452	22	,161	1,583	1,090	-,678	3,844
			1,452	21,799	,161	1,583	1,090	-,679	3,846
Kinesthetic	,280	,602	,368	22	,716	,833	2,265	-3,864	5,531
			,368	20,180	,717	,833	2,265	-3,889	5,555
Group	,303	,588	,000	22	1,000	,000	1,661	-3,444	3,444
			,000	21,560	1,000	,000	1,661	-3,448	3,448
Visual	1,564	,224	,320	22	,752	,333	1,041	-1,826	2,493
			,320	15,702	,753	,333	1,041	-1,878	2,544
Individual	,603	,446	,195	22	,847	,250	1,280	-2,404	2,904
			,195	21,809	,847	,250	1,280	-2,406	2,906

The result of the Independent Samples Test shows that there is no significant (2-tailed) value $x < 0,05$ between five learning styles preferences. Therefore, we can confirm that our null hypothesis is correct to find that there is no difference between Turkish and Bosnian freshman students on their learning style preferences according to their age.

T-TEST

(Group Statistics)

Nationality	N	Mean	Std. Deviation	Std. Error Mean
Auditory	20	14,90	2,634	,589
Bosnian	4	14,25	3,594	1,797
Turkish				
Kinesthetic	20	19,35	5,194	1,161
Bosnian	4	22,25	6,850	3,425
Turkish				
Group	20	13,83	3,543	,792
Bosnian	4	14,75	6,397	3,198
Turkish				
Visual	20	12,20	1,704	,381
Bosnian	4	13,50	5,260	2,630
Turkish				
Individual	20	13,85	3,066	,685
Bosnian	4	15,50	3,109	1,555
Turkish				

The results of the T-test table above shows that there is no difference between the mean scores of Bosnian and Turkish on Reid's perceptual learning style preferences. For this reason, it confirms our null hypothesis that there is no difference between Bosnian&Turkish freshman students on their preceptual learning style preferences. It also shows the results of the descriptive statistics indicated that Bosnian freshman students most preferred learning style is Kinesthetic with a mean score of 19,35. Auditory is Bosnian freshman students second preferred learning style with a mean score of 14,90. Group is the Bosnian freshman students third preferred learning style with a mean score of 13,85. Individual is the Bosnian freshman students fourth preferred learning style with the same mean score of individual's

which is 13,85. And visual is the Bosnian freshman students least preferred learning style with a mean score of 12,20. In comparison, the results of the descriptive statistics indicated that the Turkish students most preferred learning style is also Kinesthetic with a mean score of 22,25. Individual is the Turkish freshman students second preferred learning style with a mean score of

15,50. Group is the Turkish freshman students third preferred learning style with a mean score of 14,75. Auditory is the Turkish freshman students fourth preferred learning style with the meaning score of 14,25 and visual is the Turkish freshman students least preferred learning style with a mean score of 13,50.

INDEPENDENT SAMPLES TEST

	Levene`s Test for Equality of Variances		t-test for equality of means					95% Confidence Interval of the Difference	
	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Auditory	1,252	,275	1,702	22	,103	2,450	1,439	-,535	5,435
			2,330	6,623	,055	2,450	1,052	-,066	4,966
Kinesthetic	1,876	,185	,528	22	,603	1,600	3,029	-4,682	7,882
			,903	11,959	,385	1,600	1,773	-2,264	5,464
Group	,036	,852	,820	22	,421	1,800	2,195	-2,751	6,351
			,789	4,148	,473	1,800	2,282	-4,447	8,047
Visual	,002	,968	1,753	22	,093	2,300	1,312	-,421	5,021
			2,082	5,222	,089	2,300	1,104	-,503	5,103
Individual	4,847	,038	,087	22	,931	,150	1,718	-3,414	3,714
			,175	20,538	,862	,150	,855	-1,631	1,931

The result of the Independent Samples Test shows that there is no significant (2-tailed) value $x < 0,05$ between five learning styles preferences. Therefore, we can confirm that our null hypothesis is correct to find that there is no difference between Turkish and Bosnian freshman students on their learning style preferences according to their nationality.

DESCRIPTIVE STATISTICS

N	Minimum	Maximum	Mean	Std. Deviation
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Auditory	24	10	20	14,79	2,734
Kinesthetic	24	13	34	19,83	5,443
Group	24	8	22	14,00	3,978
Visual	24	9	21	12,42	2,501
Individual	24	7	20	12,12	3,069
Valid No.	24				

The descriptive statistics table shows that there were 24 total numbers of students who chose their most favourite to least favourite perceptual learning style preferences. The IUS freshman students most favourite learning style is kinesthetic as its mean score is the highest score with 19,83 compare to auditory, group, visual and individual perceptual learning style preferences whereas the IUS freshman students less favourite learning style preference is individual as its mean score is the lowest score with 12,12 compare to auditory, kinaesthetic, group and visual.

Discussions and Conclusions:

I have done the research project about the freshman students learning style preferences at International University of Sarajevo in the first session of the spring semester of 2015/2016. This research project particularly relate to Joy Reid`s five perceptual learning style preferences (Kinesthetic, Auditory, Group, Individual and Visual). These five perceptual learning style preferences based on IUS freshman students`s gender (males&female), age (18-20&21-22) and nationality (Bosnian&Turkish). In Joy Reid`s perceptual learning style preferences questionnaire survey (1987), the numbers of both Turkish and Bosnian freshman students as participants were the same in total. In relation there were 12 Bosnian and 12 Turkish students attended as participants to answer the questionnaire survey. However, the number of freshman students who are aged between 18-20 years old more higher than the number of freshman students who are aged between 21-22 attended as participants based on their age groups in the questionnaire survey. In relation, there were 20 numbers of students who are aged between 18-20 years old participated in the questionnaire survey whereas there were only 4 numbers of students who are aged between 21-22 years old participated in the questionnaire survey.

In Reid`s previous perceptual learning style preferences questionnaire survey results had already showed that, participants of ESL students mostly preferred kinesthetic and tactile learning methods. Both graduate and undergraduate students mostly had preferred also kinesthetic and tactile learning styles too. In comparison to our present study, the IUS freshman male&female students most preferred learning style is kinesthetic as well. In relation, the male freshman students have the highest mean score of 20.25 in kinesthetic and the female freshman students have the highest mean score of 19.42 in their kinesthetic learning style preferences. IUS freshman male students other most preferred learning styles with their high mean scores are

followed by auditory (15,58), visual (12,58) and individual (14,25). Similarly, IUS freshman female students other most preferred learning styles with their high mean scores are also followed by auditory (14,00), visual (12,25) and individual (14,00). Both male and female freshman students preferred learning style on group studies have the same mean scores (14,00).

The study also showed that 18-20 years of age groups most preferred learning style is kinesthetic with a mean score of 20,10 and the 21-22 years of age groups most preferred learning style is also kinesthetic with a mean score of 18,50. But both IUS 18-20 years old and 21-22 years old freshman students's the following most preferred learning styles lists are a little bit different than each other. In relation, IUS freshman students who are aged 18-20 years old other most preferred learning styles with their high mean scores are followed by auditory (15,20), group (14,30), individual (14,15) and visual is the (12,80). In contrast, IUS freshman students who are aged between 21-22 years old other most preferred learning styles with their high mean scores are followed by individual (14,00), auditory (12,75), group (12,50), and visual (10,50). In addition, both IUS freshman students who are aged 18-20 years old and 21-22 years old the least learning style preferences are the visual learning.

The IUS freshman students gender and age groups descriptive statistical test results showed similarly that their most preferred learning style is also kinesthetic with high mean scores on nationality. In relation, Bosnian freshman students most preferred learning style is kinesthetic with a mean score of 19,35 and Turkish freshman students preferred learning style is also kinesthetic with a mean score of 22.25. Although both Bosnian and Turkish freshman students kinesthetic learning styles mean scores are high with each other, Turkish freshman students mean score is higher than Bosnian freshman students on their kinesthetic learning style preferences. And both Bosnian and Turkish freshman students other following most preferred learning styles lists are also little bit different than each other. In relation, IUS Bosnian freshman students other most preferred learning styles with their high mean scores are followed by auditory is (14,90), group (13,85), individual (13,85) and visual (12,20). In contrast, IUS Turkish freshman students other most preferred learning styles with their high mean scores are followed by individual (14,00), auditory (12,75), group (12,50), and visual (10,50). In addition, both Bosnian and Turkish IUS freshman students the least learning style preferences are also the visual learning.

In the background studies, I had also mentioned that the previous Joy Reid's perceptual learning styles preferences questionnaire survey also took place at Tarbiat Moallem University in Tehran, Iran. The descriptive studies showed that the results of the most preferred learning style was visual and kinesthetic was the second most preferred learning style with their high mean scores by students. In contrast, our present study shows that IUS freshman students most preferable learning style is kinesthetic and their least preferable learning style is visual. This evidence proves that students learning style preferences are not stand still and it depends on their preferences about how they learn best or how they like to learn at their educational institutions. Although IUS freshman students have different gender, age and nationality groups with each others, their most learning style preference is kinesthetic because they like to learn best by using their physical activity. They are not like reading or listening types of learners. They are

mostly like creative type of learners. They feel like they enjoy learning better if they make a model of something in class projects or if they can participate in related classroom activities. They like to discover their learning subjects by using their bodies and they like to move around to use their high levels of energy in their classroom activities. In relation, when IUS freshman students as kinesthetic learners move around, they understand efficiently about how to respond either the new or existing learning subjects in the classroom. Thus, it helps them to pass their exams with good grades. On the other hand, IUS freshman students least learning style preference is visual because they are not very comfortable drawing pictures and using graphs, diagrams or charts as part of their classroom activities while they are learning their courses in the classroom.

In conclusion, the learning style preferences of freshman students in their language learning process should not be only consider to one most preferable learning style which is kinesthetic at International University of Sarajevo. The freshman students perceptual learning styles should consider to multiple learning styles in order to increase their study performance and achieve good exams results throughout of their academic career. In relation, Abidin, Rezaee, Abdullah & Singh (2011) cited Dunn and Dunn (1986) : ‘‘multi-style learners tend to achieve more and score better than learners with one or two learning styles’’. If freshman students only good learners at kinesthetic, teachers should also combine that learning style preference with the group learning style, auditory learning style and the visual learning style although visual learning style is the least preferable learning style by Bosnian and Turkish students. For instance, a teacher can give his or her students to deal with a class group project on which kinesthetic, auditory and visual learning styles could be combined with each other successfully. Because IUS freshman students who mostly prefer kinesthetic learning style are majoring in English Language and Literature. But visual learning style is also the essential part of English Language and Literature. In relation, students can write a playwright together and they can draw the posters and print out their drawn posters as images of that theaterical play as visual learners. They can read and listen their playwrights as auditory learner. And then they can perform that theaterical play on the stage as kinesthetic learners. Teachers obviously should think that they were also the students once in past. Therefore, they should also be realized to arrange their teaching styles in order to match with their students learning styles preferences. In this way, it will not only help freshman students to increase their concentration and show their interest for what is being taught in the classroom but it will also help teachers to create a positive learning environment in order to teach their students efficiently.

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New Approach to Dramatic Writing

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ABSTRACT

Since the dawn of dramatic writing, writers and academics tried to explore the possibility of creating a formula for dramatic structure. Aristotle was the first to suggest such formula by describing the “Three-act structure”. Not only it worked then, it still works today and is used as a foundation in the creation of various film scripts. Many writers have furthered the approach by suggesting additional guidance in their work such as Christopher Booker, Sherri Sheridan and Ronald B. Tobias.

The mentioned works suggest two things: each story should be treated the same and the characters serve the story. Because of these reasons and my personal understanding that a 2 500 years old idea should not be the current drive for a film narrative the article aims to explore a new possibility for a plot system. This approach is based on the relationships within the story. It is motivated by the characters, not by the narrative which is treated as information. The research methods used include, but are not limited to, structural analysis of existing works, theoretical overview and comparative case study analysis. In result, a story structure that is not simply working efficiently but is optimal in terms of effect and emotional charge is presented as an alternative approach to classical three-act scriptwriting. The article corresponds to the basic principles of narrative and plot structure already established but at the same time it creates a new dimension in storytelling that could possibly alter the way we tell stories.

Key words: dramatic writing, new approach, narrative structure, three-act structure, character design, storytelling;

INTRODUCTION

The art of drama lies at the very heart of human personality (Lavandier, 2005). We have profound need to tell stories to each other. It has developed and adapted to our ways of communication but from the *Epic of Gilgamesh*¹²⁶ to modern-day film scripts the fundamental reasons for that need remains the same - finding familiar ground, entertaining each other and learning through shared experiences. We tell stories in a specific manner in order to provoke the expected kind of emotion in our listener. This structure becomes the backbone of our story and its success or failure depends on it. By giving such importance to the way the audience receives the information and to the emotional impact of the telling we create a need for patterns in which we articulate our stories in order to avoid misinterpretations.

Within the long history of narrative’s development, what is currently considered classical or traditional narrative structure is often labeled as the “Aristotle’s Arc” (Madej, 2008, p.2). In his

¹²⁶ *Epic of Gilgamesh* is an epic poem from ancient Mesopotamia (circa 2100 BC), often referred to as the first great work of literature.

work *The Poetics*, Aristotle describes a sequence of events with a beginning, middle, and an end; that consists of three main components -an introduction, climax, and denouement (1997). He suggest that the audience would undergo a “purging”, the literal meaning of *katharsis*; seeing a dramatic situation aroused emotions of terror and pity which, in a successful tragedy, would be relieved by a satisfactory conclusion(Morrow, 2014). Some of the elements of his discussion such as Prologue, Episode, Exode and others have been progressively excluded over the ages as the viewers’ needs and dramatic styles evolved. However, the basic fundamentals of the theory remained unchanged. Even though this structure was not dominant in classical times it established itself as such in mid-19th century.

The well-made plays of the 19th century gradually led to the development of a slightly different structure introducing a twist at the beginning of the third act as a means of re-launching the action(Lavandier, 2005). This was initially embodied in the work of the pioneer German playwright and novelist Gustav Freytag - *Die Technik des Dramas*, a definitive study of the 5-act dramatic structure (1908). The combination of Aristotle’s and Freytag’s theories in a structural model set the norm for writers and later gave birth to associated story theories such as Field’s Paradigm, Hauge’s Six Stage Plot Structure, Truby’s Twenty-Two Building Blocks, Seger’s Story Spine (2003), Vogler’s description of the Hero’s Journey (1998), McKee’s Central Plot (1997) and The Quest as well as others. What all of them have in common is that they are all based on the preset pattern model where the author arranges the sequences in an already stipulated order with the belief that this way he will best affect the audience.

However using the same patterns to articulate different stories might prove dangerous to the story’s emotional impact and influence. In his article “What’s Wrong with the Three Act Structure”, James Bonnet argues that this kind of dramatic rhythm appeared in theater plays because of the need for intermissions and a movie is a continuous action so a new approach might be more affective for the screen (2008). But the bigger issue with these patterns might prove to be the availability for creative input or rather the lack of it. The story is about originality, not duplication. Originality is the confluence of content and form – distinctive choices of the subject combined with the unique shaping of the telling (McKee, 1997, p. 14). But can we really discuss unique storytelling if we are using already stipulated presets with anticipated development as the norm? Doing the same thing over and over again and expecting a different result is truly insane but repeating the same pattern of sequences and expecting to maintain and produce the unchanged dramatic effect they originally had might be next to impossible.

In “*Prelude to Literacy: A Preschool Child’s Encounter with Picture and Story*” Maureen and Hugh Crago describe the emerging narrative process of their daughter from the ages of one to five - before she learns to read (1983). The study of Anna Crago’s views of narrative as a young child shows she saw narrative structure differently from what was expected. For her, beginnings and endings had only a ritual role in the telling, and binary actions or events and favorite characters had higher value and importance(Crago, 1983, p. 280). This should not come as a surprise because Freud, Nietzsche and others have observed that identification is one of the basic pleasures of drama (Lavandier, 2005) but this could offer a possibility for a new approach.

Yves Lavandier maintains the idea that every fictitious action contains three logical parts: before the action, during the action, and after the action. Indeed, many writers and story theorists have concentrated on the action's execution but Freud and Nietzsche's theories beg the question which has the more powerful influence over the audience – is it the action or the character who is conducting the action? Listed above we saw a number of action(*outcome*)-driven theories but let us consider a character-driven one and its possibility to influence the audience. A given action can be represented differently depending on the perspective of each character taking part in that action (Porteous & Cavazza, 2010, p.2) and studies show that a person's personality can be used to predict the type of a story character and her/his behavior type (Su, 2007, p.1).

This suggests a possibility for the implementation of a different approach to dramatic writing. In it the lead character can be accepted as a prime driver of the story and he/she will affect rather than simply live and react to the happening. This enables the potential for a more emotionally charged and unpredictable way of storytelling and storybuilding. That, of course, does not exclude the possibility of expectation and foresight from the audience's side but this foreseeing will be dictated strictly by the connection between the viewers and the characters that was forged during the viewing of the film. The viewers may be able to predict the upcoming event(s) but this prediction would be based solely on a logic created through their level of understanding the protagonist and the information they had gathered by themselves during the screening up to that point instead of a conscious or unconscious understanding of the structural patterns. Through this connection we will present the audience with a better opportunity for an active viewing¹²⁷ which suggests a more emotional involvement and investment on their side and therefore a more significant impact of the story and higher satisfaction from the engaged viewing experience.

Climactic structure that is a product of dramatic criticism cannot sustain the diversity of narrative that the human condition warrants (Mallon, 2005). The direction we take for constructing a broader framework from which to conceptualize narratives for all media needs must include this important understanding – that narrative is based in process and experience rather than structure, and the climactic plot does not reflect the process of our lives very well (Madej, 2008, p.5).

Whenever we talk about structure we are, willingly or not, speaking about a pattern and from there on we are talking about a template. Plot structure explains how to recognize and fix plot problems but persistent plot problems are often more closely tied to plot elements an author has not considered than to plot elements the author has reworked (Huntley, 2007, p.11 and p.19). While we are reworking the script so it would fit into the chosen structure, without realizing it, we take away a part of the story's uniqueness in order to force the pieces of the puzzle to fit in the framework. This could be considered a sacrifice of significance because we are dropping information and meaning from the script in order to gain questionably wider acceptance. There cannot be solid evidence that the audience has received the information as we intended. At the same time, by pushing it in the direction the structure requires us to go, we might be drifting it further away from the direction it was supposed to take. Instead of trying to recognize the

¹²⁷ **Active audience theory** – an active viewer analyzes, identifies, compares, and contrasts both the content and the techniques presented. (see Munday & Chandler, 2011)

problem in the ordering of sequences we should concentrate on the motivation and logical execution on the characters' behavior – two elements that are frequently overlooked when working in set structure.

An excellent example would be *Spider-man 3* (2007) which is full of inconsistencies due to similar issues. In it we can find a scene in which Harry Osborn (James Franco) randomly learns that his father was not killed by Spider-man (his best friend) but by his own blade. This information is brought to him by his most trusted servant, who we have not seen up until that point, and who was apparently withholding this information three-to-five years before he decided to share it with the son of the deceased without any good personal interest for both keeping the secret or telling it. In the next scene we see Harry, who for the past two movies was a sworn enemy to Spider-man and not to mention he nearly killed him in a fight over Mary Jane earlier in the film, flying on top gear screaming "I'm coming to save you, buddy". As much as this was intended to fit in as a turning point in the film's three-act structure, its obvious inconsistency had a severe negative impact on the entire film.

The protagonists' objective must be clearly indicated so that the spectator can share it (Lavandier, 2005) but in this movie they were inconsistent so we remained indifferent. But we cannot expect a consistent behavior if we are relying on a consistent pattern of actions. We use one as the given in order to evaluate the other (Huntley, 2007, p.4). When looking for meaning, we assume a particular story structure. When looking for structure, we already have assumed character intent. This is why structure sometimes disables the characters by forcing them to accept an action that is against their natural behavior for the sake of following the rhythm of the storytelling. The first thing that needs to happen in order to liberate the characters' from this vicious circle is to dismiss structure as a needed instrument and replace it with a system instead. Structure predisposes the writer to use specific number of actions, lined in a specific order. This disables the author from making decisions and it could lead to incorrect use of the character. A system not only enables the author to make decisions but it requires him to do so in order to move the story forward. Every taken decision would affect the outcome but it would also remove the other options that were not chosen. For example – the author could decide between A, B and C parallels. If he chooses B he would then be presented with B¹, B² and B³ but choices A and C will not be available to him. This is not to say that he won't be able to go back and pick one of the previous choices he was presented with (A or C) while he is constructing the script but every time he makes a choice, this will result in discarding the other available answers. This secures creative freedom and the originality we mentioned above.

If we accept to adopt a system in which the driving component of the story is the leading character, rather than the event, then we must also recognize that he is not a single cell, but an individual part of far more complicated system which possesses persistent interpersonal relationships between the individuals in it and the story itself is simply a product of these relationships. In this case our primary tools of such system must be: ***Society, Individual and Language.***

These tools should not be self-sufficient but connected in a one-way relationship where one item influences the second that influences the third. By establishing this order we present a coherent hierarchy that is arranged according to the tool's capacity to influence the story and its outcome.

In this case **Society** should be accepted as the tool with the biggest capacity to alter the story because it can affect all of the *individuals* who are a part of it. In his work *Marxist Media Theory*, Chandler assigns two main attributes to the human society (2000). The first he calls '*the superstructure*' which includes the group's **culture**— their beliefs. Its prime purpose is to set the values of the group and define its reality. In a similar manner when a scriptwriter describes a story he creates the parameters for reality in the story. The story is something very private. It occurs in a certain time, in a defined place and is relevant only to a certain set of characters who are involved in it. There are many films that take place in England, but only one series recognizes the existence of Hogwarts.

When we create a story we accommodate it in a setting. That story is developing in a certain ambience that has its own definitions for normal and abnormal. In the first scene of *Harry Potter and the Philosopher's Stone* (2001) we observe how a cat turns into a woman; an old man steals the lights from the streetlamps with his lighter and how a giant arrives on the scene with his flying motorcycle and baby in hand. Not even one of the participants ever questions the authenticity of the other characters and their actions. By their actions and reactions they establish the reality in which the story will take place and we accept that reality as true because we use their evaluation for it. If either one of the characters said: "*I think I over did it with the hallucinogenic pills*", we would be watching a very different film.

Culture can and should be applied for any genre of film. The clearer its borders are, the higher the possibility to understand the meaning of the story will be and that would raise the enjoyment of the viewing experience altogether. The film *The Godfather* (1972) opens with a wedding ceremony during which the men of the family had gathered in a dark study to take requests for murders and personal vendetta. This determines the tone of the overall drama. By creating **culture** the author is letting us know what to expect from the movie. In what kind of environment the story would be set in. It puts it in the context of the setting which gives it deeper meaning. In *The Godfather's* case, Mario Puzo establishes the underground society that feels above the law and applies violence to bring benefit and justice as they see fit. He creates the scene and we as viewers submit to it. This is why all the killings and extortions that happen in the movie are accepted by the audience. If this was a family friendly film and had any of the above-mentioned elements in the story, its authenticity would have been rejected and it would hardly have found its audience and cult status.

The **culture** in the story creates the arsenal of tools the characters can use and bans the ones that are not part of the overall tone. But in order to be effective, the **culture** must remain consistent throughout the film and in all of its sequels/prequels if any are created. Otherwise, that carefully crafted truth the author has built in the reality of the story would suffer and the *Suspension of*

*disbelief*¹²⁸ would be reduced accordingly. In the first *Superman* movie (1978), Superman flies around the earth so fast that it begins turning in the opposite direction and this somehow turns back time on Earth. In the scene he reaches his maximum speed, the Earth comes to a complete stop for a few seconds, then begins rotating in the opposite direction. This goes on for 30 seconds as we see events on Earth "un-happen". Once he's finished, Superman comes to a complete stop, and then begins flying in the direction of normal rotation that spins the Earth the right way. This scene successfully made many fans of the franchise very upset because it didn't fit with the **culture** that was previously established by the comics. In the world of Superman he is all powerful but his powers affect him alone and he uses them to do good deeds. When he spins the Earth backwards, he subliminally gives superpower to the planet as well – something that was not incorporated in the set **culture** or at least it was not articulated clearly. As a result, many fans feel the need to interpret this scene as if only Superman went back and not the whole planet as it was depicted in the film.

The second aspect of society assigned by Chandler is '*the base*' and it refers to the **relations** between the individuals who take part in '*superstructure*'. This makes a lot of sense because a group with common goal and values must have its members communicate with each other in order to achieve the expected results. The *base* determines the *superstructure* in a one-way relationship (Chandler, 2000). The *culture* in one society determines the **relations** in that society and how they are conducted. Those relations can be evaluated in two aspects – rank and charge.

In terms of **rank** the relations refers to the place of the characters in the *society*. Two characters from two different ranks (employer-employee, ruler-ruled) would never communicate as equals because the person of the higher **rank** would not allow it. This would influence the strength of his position and its authority. It must be noted that sometimes in one society we can find micro societies and then a character could be entitled to more than one **rank**. For example a man who works as a coal miner and is not highly regarded as an authority in his working place goes back home where he is the head of the family – father and husband and then his **rank** develops meaning that enables him to take decisions but that applies solely for the micro-society. We must also recognize that a caring father would have higher ranking in that society than a neglectful father. This brings us the need to set defined measurements by which we can evaluate the ranks of all characters in the society. The most accurate way to do that would be to adopt the *three-component theory* as the regulator. In his work, the German sociologist Marx Weber develops three distinct independent factors that form an individual's place in the social hierarchy; class, status, and power (1978).

- **Class:** A person's economic position in a society. It is associated with his wealth and property.
- **Status:** A person's prestige, social honor, or popularity in a society. This reflects to the respect with which a person or status position is regarded by others.

¹²⁸A term coined by Samuel Taylor Coleridge in 1817 that suggests that the reader/viewer would suspend judgment concerning the implausibility of the narrative if the writer could infuse a "human interest and a semblance of truth" of the fiction.

- **Power:** The ability of people or groups to achieve their goals despite opposition from others.

By using this method we could quickly evaluate the characters' positions and the reasons behind it. Through this we can also locate the place of the main character of the story and this will affect how he accepts the world he/she is surrounded by. In Harry Potter we follow a character who was left out of the society and who tries to earn his place back in while in The Godfather we follow a character (Michael Corleone) who is part of a society and is trying to get out of it.

In the wizard world of J. K. Rowling the highest place is awarded to the headmaster, then the professors and then the gatekeeper. Mario Puzo defines the Godfather as the highest ranking position, then the Consigliere and then the other outlaws. In every social net there is an already established hierarchy that is created depending of the value of the individuals for the group and their capacity to enable the group. These attributes are set by the above-mentioned factors.

If the **rank** defines *what* the relationship between the characters is then the **charge** evaluates *how* it is conducted. The **charge** refers to the emotional connection established between the characters and their interaction. It is based on characters' ranks as well as their personal culture and previous experience. If two schoolmates have a fight in class the previous day they are expected to feel dislike the next time they meet. The characters' communication very closely resembles the theory for biological interaction (Elton, 1968). We can use that theory to evaluate the **charge** of the relation between the characters because the theory explicitly indicates the quality of benefit or harm implicated to both parties and that would result on their way of communication. The **charge** can be positive, negative or neutral. Neutrality occurs when two characters do not communicate directly with one another and their actions do not affect either of the characters **ranks**.

Negative:

- **Competition** - Mutually detrimental interaction between individuals in which the fitness of one is lowered by the presence of another. Limited supply of a resource or having common goals could become reasons for competition. It can occur in both a direct and indirect fashion.
- **Amensalism** - An interaction where an individual inflicts harm to another one without any costs or benefits received by the first. Amensalism could represent the presence of one individual that disables or limits the growth in rank (or in either of the rank's forming factors) of another without the intent of the first party.
- **Antagonism** - An interaction between individuals in which one is willing to sacrifice or harm the other for personal benefit, interest or pleasure. The difference between Antagonism and Competition is that the first is spooned from intent rather than need. The harm is not crucial for the surviving of the abuser. It can only be executed in direct confrontation.

Positive:

- **Commensalism** – This interaction benefits one organism while the other is not affected - neither benefited, nor harmed. It is the direct opposite of the Amensalism interaction. Usually in Commensalism the benefited side does not recognize the benefactor as an authority.
- **Mutualism** - An interaction between two or more individuals, where they derive a mutual benefit from each other. This refers to any kind of willing co-operations (including but not limited to lovers, friends and business partners) where both sides recognize the other as a partner and value his/her opinion regarding decisions.
- **Altruism** – The principle of concern for the welfare of others. This interaction is best described through the bond of blood and family ties. One or both sides involved in this interaction may be obliged by the moral code to participate in it rather than the personal need or decision to do so. It is often depicted as positive though in many cases we can find it as a mixed interaction that leans closer to positive charge. It is established by the culture and rank.

After we have established the common and personal values of the society, its ranking classes and the relations between them, we have created conditions for a **happening** to occur. This is the third and final aspect of the story's *Society* that creates the core of the drama in the telling. However, this aspect cannot exist without the previous two already in place. The interpersonal relations between the characters create the events we will narrate in the story. This is often referred to as an incident or a conflict by the other script theories. However, this cannot be accepted as a satisfying description when we talk about character-driven story. The term incident usually refers to individual event that occurs casually (without an anticipated intent) in connection with something else. In this case this term is not acceptable because when we are working in the framework of a character-driven system, all the events that take place are intended. There is no place for randomness when we use clear motivation of the characters and we base the story on them. Conflict also doesn't seem to be sufficient term because it enables only part of the **happening**.

Rahim defines conflict as an interactive process manifested in incompatibility, disagreement or dissonance within or between social entities (Rahim, 2010, p. 16). And while this is a very clear and reasonable definition it is also suggesting the need to have two parties in order to occur which is not always the case in stories. In *Armageddon* (1998), the Earth is about to collide with an asteroid that will extinct the life on the planet. The human species represents one side but the asteroid is not a living object and therefore it cannot represent or be represented by anything. Another example is the film *The Descendants* (2011) that won an Oscar for Best Writing, Adapted Screenplay. A husband is trying to arrange a funeral for his spouse after she suffers a boating accident. The **happening** in the film is coming from the leading character who is trying to overcome the personal problem and lacks any antagonist or a second side representative. Some would argue that this should be considered an *internal conflict*¹²⁹ that is represented usually by some ethical or emotional question. However, from Rahim's definition of a conflict it

¹²⁹ **Internal conflict**- A struggle that takes place in a character's mind (Rector, 2008).

becomes evident that this cannot be the case due to the lack of a second party. A position that offers two or more possibilities, each resolution possessing both positive and negative side to it can be best described as dilemma. But a dilemma, especially one that is personal, is very difficult to present to the outer world (any person who is not in the position to make decisions) in an engaging for the audience manner and therefore that definition won't do us much good either.

This brings us to the point where we must introduce a new term to the configuration in order to fully accommodate all possible **happenings**. What seems to best fit the system we established so far is agreeing that there is always a **happening** in the story that is the core of the drama. That **happening** is a product of the society's culture and the relations in it and results in one of the three possible outcomes: a **conflict**, a *problem* or a *situation*. Each of these outcomes needs the involvement of the character(s) of the story in order to be resolved. Usually, the resolution of the happening would bring some kind of benefit or reward.

We already accepted a good definition for what **conflict** is but what can we take away from it? The first thing we need to recognize is that this *happening* is behavioral-based issue. It defines opposing interests between two or more parties. There must be a belief by each side that the other one is or will act against them and this belief is likely to be justified by past interactions between the individuals or groups (Rahim, 2010).

Roy and Judy Eidelson (2003) investigated some of the important roles that beliefs may play in triggering or constraining **conflict** between groups. On the basis of a review of relevant literature, five belief domains stand out as relevant and three of them are especially noteworthy: *Superiority*, *Injustice* and *Distrust*.

- **Superiority** - This core belief shared convictions of one group for moral superiority, entitlement and special destiny over a second entity.
- **Injustice** - The perceived mistreatment by specific others that can lead them to identify something as unfair which is merely unfortunate, and thereby to inappropriately engage in retaliatory acts. This mindset can mobilize powerful and violent collective insurgencies, especially because shared perceptions of injustice typically heighten the identification and allegiance that individuals feel towards their group. The different cultures of the group tend to have different definitions for what constitutes justice, and different norms for how it should be achieved.
- **Distrust** - This core belief focuses on the presumed hostility and malign intent of others. The expectation that others will hurt, abuse, humiliate, cheat, lie, or take advantage usually involves the perception that harm is intentional or the result of unjustified and extreme negligence.

Any story that includes two or more clearly defined entities that possess one or more of the beliefs mentioned above can be listed as a conflict based drama. Star Wars, Lord of the Rings, The Matrix and many other films and film series can be identified as based on a conflict.

This leads us to the next happening – the **problem** based story and the need to define its perimeters. In psychology, problem solving refers to a state of desire for reaching a definite 'goal'

from a present condition that either is not directly moving toward the goal, is far from it, or needs more complex logic for finding a missing description of conditions toward the goal (Robertson, 2001, p. 2). **Ill-defined problems** are those that do not have clear goals, solution paths or expected solution. **Well-defined problems** have specific goals, clearly defined solution paths and clear expected solutions (Schacter, 2009, p. 376). From this we can gather that the **problem** is not behavioral but personal factor. It is spooned from a need and it defines the interests of one individual which does not exclude the possibility that they are shared by a larger group. The whole drama revolves around the protagonist trying to achieve that goal. This means the resolution of the happening would usually affect the lead character more than it would affect the *society* in the story. In the movie *Flight* (2012) we follow the story of a pilot who battles his addictions and moral dilemmas, in *The King's Speech* (2010) we follow the story of King George VI who battles his speech handicap and in *The Descendants* (2011) a husband is trying to resolve a moral question if he should invite his wife's lover to her funeral or not. These examples can prove that this kind of happening is promptly observed in dramas but it could work for some types of comedies as well. In *We're the Millers* (2013) a pot dealer creates a fake family as part of his plan to move a huge shipment of weed into the U.S. and in *Harold & Kumar Get the Munchies* (2004) we follow an Asian-American office worker and his Indian stoner friend embarking on a quest to satisfy their desire for White Castle burgers. These comedies resolve around character's personal agenda and what he is willing to do in order to fulfill the goal he has set for himself.

In an event of **situation** we find our characters in a difficult set of circumstances they need to live through or overcome. Unlike the previous two, this happening is more influenced by external factors than by internal traits or motivations. By this we can define it as an environmental based issue. It is also important to note that if resolving a problem benefits one individual, resolving a **situation** benefits a group or the whole society. This happening is usually defined by a threat that needs to be resolved for the sake of the group and fits well in most horror or adventure films. In *Independence Day* (1996), aliens have invaded the Earth, in *Jaws* (1975) gigantic shark begin to menace a small island community and in *Zombieland* (2009) a group of people travel across a zombie-filled America. Sometimes the **situation** is too complex and it can't be resolved by our characters alone, however they need to endure that **situation** in order to survive. This is very accurately depicted in *The Mist* (2007) where a small band of citizens hole up in a supermarket and fight for their lives against species of bloodthirsty creatures. The drama then lies in the character/s' ability to survive and how he/she does so in the set circumstances.

With this we successfully have defined what the instrument of **Society** is with all of its aspects and the purpose of each of them. Society sets the scene where the story will take place by evaluating the culture of the people involved in it. It defines what their way of communication is, how it is conducted and as a result of that communication occurs a happening around which the story revolves. After answering to all these questions, we have created the base environment of what our story would be about and that lead us to the logical continuation of the system to question for who our story is?

The instrument of the **Individual** has a purpose to define the characters who are involved in the story. We already spoke of characters' ranks and relations however those factors cannot singlehandedly produce a personality. In the *Poetics* theory Aristotle defines the characters as one of the three objects that represent the Athenian tragedy (1997). He understood that character should not denote a fictional person, but the quality of a human being acting in the story and reacting to its situations with the purpose that the audience will more easily sympathize with the character. In his book *Aspects of the Novel*, Forster defined two basic types of characters and their importance for the development of the novel: flat characters and round characters (Forster, 2005). Flat characters are rather simple and by contrast, round characters are complex figures with many different characteristics. The question then becomes how does the writer create that sense of reality and human personality? Elizabeth English defines complexity with the character's weaknesses (2002). She suggests that imperfections or flaws make him/her appear more human-like, causing the audience to identify him/herself with that specific character. But in that case how can we create a positive character if we are only using negative traits?

If we accept the idea that the character is an **individual** with relatively permanent traits that manifest throughout the telling, then we should assume that these will be his/hers inventory to express him/herself in the context and parallel of the film and because of that we can't use only positive or only negative traits to describe a character. This contradicts the system of alignment that is currently being used for creating a narrative (Zybstrski, 2011). In it we are introduced to three possible axes (good, neutral, evil) each of them with three possible states (lawful, neutral, chaotic) that represent the characters. However this predisposes the idea that one of the characters is evil by default which is not in sync with the idea that each character is motivated by personality, but suggests that his existing personality is motivated by the need for a villain. The definition of *Society* we established discards the need for a villain or a hero because we already have accepted that a given action can be represented differently depending on the perspective of each character. In that case instead of antagonist and protagonist we could assume a theory which allows the existence of two types of characters – **main character** and a **supporting character**. The difference between the two types comes from where the focus of the story falls.

A **supporting character** can have a positive or a negative relation to the main character but that single relation do not define his/her traits. His/her purpose on screen is to underline the traits of the main character and through this we find two types of **supporting character** – *do's* and *don'ts*.

The **Don'ts** characters are the types of characters that represent the things the main character do not identify himself/herself with. These characters are the same gender as the main character of the story. They can assume the opposition of the main character in which case they expose the beliefs the main character do not share and this way he is exposing his own priorities and values. A good example for this would be the film *American Gangster* (2007) where the main character is a drug kingpin and his opposition is the police detective who is trying to capture him. In this case the main character believes in personal gain instead of common good. That creates him as an individual who is not a classical protagonist but an antihero. Yet, he is still the focus of the story.

The second type of **Don'ts** characters is when they assume the position of a partner/sidekick¹³⁰. However, they are still represented as a counterpoint to the main character (McNamara, 2008). Good examples are Sancho Panza and Doctor Watson who are not the main characters but demonstrate rationality throughout their stories that is driven from the constant irrational behavior of Don Quixote or Sherlock Holmes respectively. Another good example would be *Tango & Cash* (1989) where Tango is sophisticated and Cash is wild and unpredictable. This way the opposites not only are attracted by one another but also contrast each other so they could help bring out their traits.

The **Do's** are usually an opposite gender to the character and often are displayed as his/her love interest. They are the type of characters that the main character is fascinated by and who's values he/she shares or identifies with. The **Do's** represent what the main character likes or what he would like to become. For example in *Fight Club* (1999) the character of Edward Norton falls for Marla who just like him attends group therapy sessions though neither of them are a victim, nor a survivor. Both of them, however, recognize they share the same disease. Both of them are broken in a similar way and being together brings them comfort. In *Stardust* (2007) we find the main character Tristan, who is by no means a popular boy, in love with the most popular girl in town Victoria. This is a trait that indicates his desire to be a leader and be liked, however once he discovers the fallen star Yvaine he becomes enchanted by something much closer to his hearth – the magic and wonder that are beyond the wall. The knowledge, skills, or rank of the **Do's** characters is usually what the main character is trying to achieve, possess or imitate.

If we accept those types of characters as accurate then the only question that remains is how do we create a believable character - that sense of reality and human personality we spoke of? Since we rejected the alignment system as applicable we need to replace it with a more accurate one. This is a rather difficult task because as Hofstee, de Raad and Goldberg note in their work, trait descriptors do not fit perfectly into simple structure models (Hofstee et. al., 1992). However, if we apply a complex structure we might overcomplicate our work and that will result in us drifting away or damaging the quality of the story we initially intended to write. At the same time, we already spoke of the need for the author to be able to make choices, so the introduced system should be broad enough to accommodate that function yet narrow enough for us not to get lost in it. In that case the best option would be to adopt not one but two simple structure models which combination would equally create the personality of the character. The first would represent the positive traits or strong sides and the second would describe the negative traits and weaknesses. Both of these models must be applied in the creation of each character regardless of the type in order to avoid flatness in the story.

Hofstee, de Raad and Goldberg describe the AB5C approach to the classification of trait that resulted in application to data consisting of 636 self-ratings and peer ratings on 540 personality traits adjectives yielded 34 well-defined facets out of possible 45 (Hofstee et. al., 1992, p. 1). These are rather large numbers that seem to carry the mixed charge we are trying to avoid. However the AB5C approach is formed of the Big Five personality traits. Those are five broad

¹³⁰**Sidekick**- a close companion or subordinate to the one he accompanies.

domains or dimensions of personality that are used to describe a human being (Costa& McCrae, 1992). The Big Five model show consistency in the profiles and is able to account for different traits in personality without overlapping or overcomplicating. This is why this system seems to be more accommodating for defying the **strong sides** of personality.

The five factors are openness, conscientiousness, extraversion, agreeableness, and neuroticism (Matthews et. al., 2003). Beneath each global factor, a cluster of correlated and more specific primary factors are found.

- **Openness** – usually refers to the character's reaction for variety of experiences. He/she can be either *curious* or *cautious*, where the first item reflects to a character with high degree of intellectual curiosity and creativity and the later describes a traditional person (Atkinson et. al., 2000). In other words *curious* relates to open for adventure characters and *cautious* tend to have more conventional interests. *Curious* are more creative and more aware of their feelings. The *cautious* prefer the plain, straightforward, and obvious over the complex, ambiguous, and subtle. Ultimately it comes down to whether a character prefers familiarity or novelty and how he/she deals with change.

- **Conscientiousness** - is a tendency to show self-discipline, act dutifully, and aim for achievement against measures or outside expectations. It is related to the way in which people control, regulate, and direct their impulses (Costa& McCrae, 1992). An *efficient* character indicates a preference for planned rather than spontaneous behavior where a *careless* character demonstrates his emotions and has a short temper.

- **Extraversion** – is characterized by breadth of activities and is marked by the engagement with the external world. This reflects on the sociability and the tendency to seek stimulation in the company of others, and talkativeness. *Reserved* characters tend to be more independent and work well on their own. They tend to seem quiet, low-key, deliberate, and less socially involved. An *energetic* character works well in team. He can be described as enthusiastic. He possesses high group visibility, like to talk, and assert himself.

- **Agreeableness** – this trait reflects individual differences in general concern for social harmony. They can be compassionate and cooperative or suspicious and antagonistic towards others. *Agreeable* characters value getting along with others and they accept the social *culture*. They are generally considerate, kind, generous, trusting and trustworthy, helpful, and willing to compromise their interests with others (Rothmann&Coetzer, 2003). *Disagreeable* individuals place self-interest above getting along with others. They are generally unconcerned with others' well-being, and are less likely to extend themselves for other people. Sometimes their skepticism about others' motives causes them to be suspicious, unfriendly, and uncooperative (Bartneck et. al., 2013).

- **Neuroticism** - refers to the degree of emotional stability and impulse control. This trait is interlinked with the tolerance for stress. *Sensitive* characters are emotionally reactive and vulnerable to stress. They tend to overthink situations which results in limiting the ability to think clearly, make decisions, and cope effectively with stress. Falling in the *sensitive* chart increase one's likelihood of falling into clinical depression or being often in a bad mood (Fiske et. al., 2009). *Confident* characters are less easily upset and are less emotionally reactive. They

tend to be calm, emotionally stable, and free from persistent negative feelings which do not necessarily mean they experience a lot of positive feelings.

All of the fore mentioned factors should be accepted as a sufficient definition for positive traits. These are the character's strong sides and even if one is more *reserved* or *energetic*, that does not necessarily mean that he/she is weaker than the other but that his personal preference and efficiency are higher in one of the two factors. Weakness can't be defined through this chart because an Introvert person would argue that a *reserved* character is strong and an Extrovert person would insist that the *energetic* character is better. The fact of the matter is that both characters have defined strong sides they express and usually prefer but that preference shouldn't make them better or weaker than a character from the opposite factor.

In the beginning the stories were resolving around Gods or godlike creatures like Hercules. However, with the development of drama the audience developed the need to relate to the character and that resulted in more human-like protagonists. Weakness is a very human and personal trait that is usually self-defined. There are some authors who create smoking, drinking or promiscuous characters and insist that those are weaknesses because he/she does not interact with such things. At the same time there are millions of smokers and alcohol consumers around the world who don't see this as a bad thing. So, how do we create a weakness that is recognized as such by the audience? For this we must return to Society. Not the society in the story but rather the society of the audience. In the Western world, society has accepted a norm for weakness which was laid from the beginning of the civilization and is best expressed by the seven deadly **sins** (Lust, Gluttony, Greed, Sloth, Wrath, Envy, Pride). By exposing the character to one or more of the sins or making him break one of the Ten Commandments, the author immediately creates a bond between the character and the Western audience. This is justified by the fact that the mass of people would easily recognize these factors as flaws because they are in a predisposition to do so. In the film *Bruce Almighty* (2003) the main character is the resemblance of Envy and in *The Big Lebowski* (1998) the character of Jeff Bridges is reflection of Sloth.

It is important to note that the characters should have flaws but they also have virtue of integrity. They recognize the basic human traits that allow for the audience to side with them. This is very important especially for the main characters because otherwise the story would be unsynchronized. We would be willing to follow the story of an antihero as long as we find signs of humanity in him. In *Breaking Bad* (2008–2013) chemistry teacher diagnosed with a terminal lung cancer, teams up with his former student to cook and sell crystal meth. This results in him becoming an antihero in mid-series, however even then he shows compassion and care for people who are closest to him.

By assigning a rank, fulfilling the OCEAN forms and assigning a sin or such to the character we enabled him/her personality to play an active role in the story we are about to tell. The only thing left to clarify is the character's **Intent**. **Intention** is a mental state that represents a commitment to carrying out an action or actions in the future (Bratman, 1987). The **Intent** sets the goal for the character, describes his plans to achieve it, follows the execution and shows the final result. It

should be able to answer the questions: What does the character want? Why does he/she want it? Is she/he able to get it at the end? The **Intent** is dependable of all the previous factors introduced in both instruments. It may change in the course of the story when one character wants something in the start but reevaluates his position by the end. The best use in practice of this tool was demonstrated by the scriptwriter Beau Willimon who in an interview shared he creates the 'show bible' through the characters. This can be described as a chart in which each row carries a character's name and each column represent a sequence or moments from the story. By filling the cells not only is he aware where each character is in any given time during the story but this enables him to see the happening through characters eyes and what the characters feels in that moment based on how much information he/she has for the happening. Decisions are made about what happens to each character and storyline, resulting in a 50-60 page document they refer to all season. This document isolates the A to B stories, beat by beat, that each character deals with over the course of the season. These decisions start to coalesce into episodes, where themes then appear (Willimon cited in Anderson-Moore, 2015).

So, by applying the instrument of the *Individual* we answer the questions: What characters takes part in that story? Who they are and what they want? How much influence each character has in the story's development? How does the story end for him/her?

With this we reach to the logical conclusion, and final instrument, of the system - the **Language**. If *Society* describes where the story takes place, *Individual* explains who takes part in it then **Language** identifies how we tell it. This represents the way the author provokes the expected kind of emotion in the audience we spoke of in the beginning. The instrument is composed by two prime tools.

The first we can identify as **Perspective**. This tool reflects on the narrative and rhythm of the story. After the author knows everything that happens in the story he decides how much of it to show us. In *Hide and Seek* (2005) the character of Robert DeNiro believes that Charlie is his daughter's imaginary friend but at the end it turns out it is his alter ego who has caused many misfortunes. The character is not seen doing all the killings as the story progresses yet he had committed them but we as the audience were unaware of that fact. Instead, the author shows us only the segments the character is conscious and finds the aftermath of his second personality's doings. Similar is the case of *Secret Window* (2004). In *Memento* (2000), Nolan tells his story backwards in order to provoke the audience yet he was fully aware what happens or rather what has happened.

The second tool is related to the **Connection** that is created between the author and the audience and reflects on how the viewer receives the information the author is transmitting through his work. Leo Tolstoy identified art as a way to communicate from one person (author) to another (the audience) by indirect means - a structure of signs in the external medium (1896). This very definition fits perfectly with the objective of the narrative and therefore creates a two-way connection between the first and second tool of the instrument. By recognizing how the audience will receive one sign the author can release or withhold information in order to influence the audience. One of the highly regarded names in the scriptwriting field – Billy Wilder, suggested

that the audience is fickle and underestimating this would reflect on how and if the story is accepted.

When the audience dedicates time for a story, they expect engagement as a reward. If an author tries desperately to surprise his audience or follow a set plot instead of being consistent to the characters and their agendas, the viewers will quickly lose their interest because they will realize how unconvincing it all is. The more subtle and elegant you are in hiding your plot points, the better you are as a writer (Wilder cited in Crowe, 2001). In order to avoid any disappointment, the author can leave clues of what is about to happen and keep the audience guessing. It is very important to stay true to all the promises made.

It is not a suggestion of the present work that the introduced character-driven system would eliminate any disappointments but rather an attempt to reduce them. From what we have noted earlier, the outcome-driven structures are effective at forecasting a story's meaning for an audience where the character-driven system suggests higher emotional value but is more unpredictable in terms of the message that gets across. The intended protagonist could turn into antihero or the audience might side with the opposition rather than the main character. At the same time, the emotional value and engagement with the story would be higher than the ones demonstrated in the three-act structure. No single story paradigm holds all the answers. Each paradigm has its story development treasures to offer (Huntley, 2007). However, the present article is a good starting point for an argument in favor of assigning more important role to the character/s instead of the outcome. In this manner, the author would bring additional benefit to the story and the audience and in result, we would have a more organic way to create and tell stories. After the story is created, of course, you can divide the action into any number of parts that you like, but it's counterproductive to think in those terms at the story's inception (Bonnet, 2008).

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The impact of teacher's politeness on students' motivation at Freshman English Course, International University of Sarajevo

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ABSTRACT

The study of L2 motivation has been in focus of the SLA research and applied linguistics for more than four decades. However, what has gained little attention is the relation between teacher's politeness strategies and learner's motivational state. Relying on the motivational theories by R.C Gardner and Z. Dörnyei and Brown and Levinson's Teory of Politeness as primary theoretical frameworks, and taking into account several recent sources on the topic, this study examined the impact of teacher's politeness on students' motivation in the context of learning English in an international academic ambience. The purpose of this paper is to prompt teachers to motivate their students by considering politeness as an important factor in tailoring their strategies yet with a particular attention drawn to gender and cross-cultural differences in perception. The results obtained through quantitative methodology indeed demonstrate that students' perception of teacher's politeness as a motivating factor varies across gender and nationality lines which shows that the phenomenon of politeness is an issue to be approached with an awareness of its multidimensionality.

Key words: politeness, motivation, gender, nationality, motivational strategies, cross-cultural differences.

Introduction

The study of L2 motivation has been in focus of the SLA research and applied linguistics for more than four decades. The reason for that is its complex nature and inevitable impact on the student's success (Dörnyei, 1994). However, what has gained little attention is the relation between teacher's politeness strategies and learner's motivational state. Undoubtedly, the learning process does not happen merely inside the learner's mind but also in a certain context be it social, cultural, or school-related. Thus, the teacher as the facilitator, guide, and interlocutor cannot be neglected as one of the primary factors in the learner's L2 competence development. Likewise, the teacher also plays a role within a context and his/her reactions to that context may vary which, as this study aims to show, influence the student's motivational state. Groham and Christophel (1992) note that "one of the assumptions which has grounded instructional communication studies" is that "the behavior of the teacher influences the behavior of the student" (p. 239). This paper seeks to show the verbal dynamics between the teacher and students in the framework of politeness. Politeness can be defined as "a battery of social skills whose goal is to ensure everyone feels affirmed in a social interaction" (Foley, 1997). In order to conduct this research in the most accurate manner and since the target national groups are Turkish and Bosnian, I wanted to make sure that the term 'politeness' refers to at least a similar

thing when it comes to Turkish cultural background because as a Bosnian teacher I can relate to the previous definition. Thus, I asked a Turkish teacher¹³¹ at English Language School at International University of Sarajevo, where the research was conducted, to define it for this purpose. Apart from agreeing that politeness is a matter of socially acceptable behavior, she also provided a more insightful and detailed definition:

Politeness, most particularly, is being respectful, considerate and thoughtful towards others. In other words, politeness can be defined as being aware of the strengths and weaknesses of other people around you. When you know what would make other people proud or what would hurt them particularly, and behave accordingly, then you can be considered a 'polite' person. The reason is, basically, you make them feel they are being valued, liked and above all understood. When such a bond is established, the relationship would be more nourishing and productive.

Ostensibly, the two definitions do not deviate much from each other, they just complement one another. Thence, bearing in mind the motivational theories by R.C Gardner and Z. Dörnyei and Brown and Levinson's Theory of Politeness as primary theoretical framework this study aims to demonstrate that teacher's politeness as a factor that contributes to the students' motivation at Freshman English Course varies across gender and nationality lines.

1. Literature review

There are two great streams of research of L2 motivation. The first one is led by R.C. Gardner and his associates whereas the other by Z. Dörnyei, Crookes and Schmidt, and others. In 1985, R.C. Gardner's socio-educational model was presented as the stepping stone in researching the nature and significance of motivation in the field of foreign language learning. Gardner (1985) defines L2 motivation as "the extent to which the individual works or strives to learn the language because of a desire to do so and the satisfaction experienced in this activity." Through his reliable and replicable empirical study, Gardner demonstrated that motivation influences students' achievement. To determine the relationship between motivation and achievement, he formulated the Attitude Motivation Test Battery (AMTB) which measures the following: "desire to learn the language, motivational intensity and attitudes toward learning the language" (Gardner and Tremblay, 1994, p.526)." Gardner (1985) also argued that external factors were negligible as long as the motivation in the students was aroused. As a response to this, another stream of L2 motivation came to be with a challenging article by Crookes and Schmidt (1991) which proposed a new research perspective involving L2 learning motivation. Followed by Oxford and Shearin (1994), they disapproved of Gardner's socio-educational model for not concentrating enough on the L2 learning/teaching context. Expanding upon this challenge, Z. Dörnyei (1994) constructed a new model of L2 motivation that consists of three motivational components: a) language level, b) learner level, and c) learning situational level. This paper is going to take into account mostly the third element, precisely the teacher-specific components within the learner's learning context. Reflecting upon Dörnyei's model, Ushida (2005) contends

¹³¹ Courtesy of Mrs Mehtap Özer Isović.

that “that model can be a useful framework not only for researchers and teachers to identify motivational sources but also to develop motivational strategies” (p.54). In a more recent study, Bernaus and Gardner (2008) investigated the language teaching strategies and their impact on students’ attitudes and motivation. Intending to focus on variables that would help teachers develop motivation in their students, Bernaus and Gardner (2008) explored the issue of teacher and student’s perception of teacher’s strategies and what the effects of those strategies are (p.389). He found that teachers should employ those strategies that are perceived by the students as effective for their attitudes and motivation (Bernaus and Gardner, 2008, p.399). When strategies are considered in the L2 motivation context, the politeness strategy comes forth as an interesting factor to be discussed. The most widely reflected upon theory about politeness is Brown and Levinson’s (1978) Theory of Politeness. B & L’s (1978) basic premise is that politeness in general terms can be explained by the concept of face and several social variables such as differences in power, social distance, and the relative imposition of particular acts. Their approach is rather broad and they study the construct of face and its aspects (‘positive’ and ‘negative’) from various perspectives but this study will consider politeness only in the context of L2 teaching/learning. One of the most important elements of the relationship between face and politeness is the face threatening act (FTA). Cutrone (2011) summarizes this idea:

FTA occurs in social interactions which intrinsically threaten the face of the speaker (S) or hearer (H), such as when one makes a request, disagrees, gives advice, etc. The potential severity of a FTA is determined by various factors, which include the following: the social distance (D) of the S and the H; the relative power (P) of S and H; and the absolute ranking (R) of imposition in a particular culture. Consequently, strategies to save face are chosen according to the gravity of the FTA. (p.52).

Although it has gained a lot of attention and acknowledgement (e.g. Kitamura (2000); Eelen (2001); Mills (2003)), it has also received considerable criticism (e.g. Gu (1990); Ide et al. (1992); Mao (1994)) among which the most notable is that of Yoshiko Matsumoto (1988). Matsumoto (1988) responds to B&L’s theory by submitting that their theory cannot be claimed and applied universally since not all cultures embrace politeness from equal perspective. She argued for amendments to their theory and tried to expand on it by theorizing politeness in the Japanese socio-educational context. Meier (1997) submits that research in foreign and second language pedagogy should go beyond B&L’s theory and that there should be an effort to raise cultural awareness. Numerous findings that relied on cross-cultural comparisons have revealed that cultural background indeed influences the choice and utilization of politeness strategies. For instance, Suh’s (1999) research on the differences in using politeness strategies between English native speakers and ESL Korean learners showed that differences existed in the context of friendship and intimate situations which, again, brings forth the importance of cultural background when politeness is concerned. This paper is going to explore the impact of the teacher’s politeness onto the students’ motivation focusing on identifying the differences in perception across gender and nationality line. In order to connect these two concepts, it is

essential that we regard teacher's politeness as his/her teaching strategy acted upon learner's motivation within his/her learning situation.

2. Research Questions

This study aims to answer the following research questions:

RQ1: : Is there a difference in perceiving teacher's politeness as a motivating factor in its general sense between males and females?

RQ2: Is there a difference in perceiving teacher's politeness as a motivating factor in any particular situations between males and females?

RQ3: : Is there a difference in perceiving teacher's politeness as a motivating factor in its general sense between Turkish and Bosnian students?

3. Method

3.1. Participants

28 freshman students of International University of Sarajevo attending the Freshman English Course participated in this research. The sample consisted of 18 males and 10 females, of Turkish and Bosnian nationalities, aged from 19-25 years old.

3.2. Null hypotheses

- There is no difference between males and females in their perception of teacher's politeness as a motivating factor in its general sense.
- There is no difference between males and females in their perception of teacher's politeness as a motivating factor in particular/isolated situations.
- There is no difference between Bosnian and Turkish participants' perception of the teacher's politeness as a motivating factor.

3.3. Instruments

One questionnaire was used to conduct this study and it was a questionnaire that was modeled after the one in "Gender and Politeness in a Foreign Language Academic Context" written by Bacha, Bahous, and Diab (2012). The authors created a survey which prompted the students to describe behavior in the classroom from least polite to most polite on a likert scale. The questionnaire in this paper comprises of 14 questions indicating on a likert scale whether the student is motivated if the teacher is polite. The questionnaire involved demographic data: gender and nationality.

3.4. Procedure

The questionnaire was administered in the middle of the fall semester 2014/2015 by two

teachers of Freshman English Course to their students randomly. Freshman English Course is a required course for all students at the university irrespective of their programs. It is a course aimed at providing the basics for utilizing English as a second language in an academic context. The participants were told about the purpose of the research, that the information they provided would not be violated, and that their participation was entirely voluntary. The teachers also assured their students that filling in the questionnaire would require only 5 minutes of their time at the end of their lesson.

5. Data analysis

The data obtained from the questionnaire was analyzed with the use of SPSS 22 for Windows (Statistical Package for Social Sciences) data editor. Independent Samples T-test and test of Means were applied to compare the means of the participants in terms of gender and nationality.

6. Results and findings

6.1. Descriptive statistics

In the study, there were eighteen male participants (N=18) and ten female participants (N=10) whose percentages are visible in the table below. (Table 1).

		Gender			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	18	64.3	64.3	64.3
	Female	10	35.7	35.7	100.0
	Total	28	100.0	100.0	

Table 1. Descriptive statistics of males and females.

When it comes to the division of participants across nationality line, according to Table 2, there were mostly Turkish participants (71.4%), and then Bosnian (28.6%).

		Nationality			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Turkish	20	71.4	71.4	71.4
	Bosnian	8	28.6	28.6	100.0
	Total	28	100.0	100.0	

Table 2. Descriptive statistics of Turkish and Bosnian national groups.

6.2. Research findings

RQ1: Is there a difference in perceiving teacher's politeness as a motivating factor in its general sense between males and females?

The descriptive features of the sample group on gender variable are demonstrated in the table below whereby the Means of both genders are being juxtaposed (Table 3.)

Group Statistics

Gender		N	Mean	Std. Deviation	Std. Error Mean
Politeness	Male	18	45,00	3,464	,816
	Female	10	44,30	3,592	1,136

Table 3. The Group statistics of males and females with their respective Means juxtaposed. Independent Samples Test was performed in order to investigate the existence of the differences between males and females in their perception of teacher's politeness as a motivating factor in its general sense and the results are as follows in Table 4.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Politeness	Equal variances assumed	,488	,491	,506	26	,617	,700	1,384	-2,145	3,545
	Equal variances not assumed			,500	18,141	,623	,700	1,399	-2,237	3,637

*The mean difference is significant at the 0.05 level.

Table 4. The Significance between males and females in perceiving teacher's politeness as a motivating factor in its general sense.

RQ2: Is there a difference in perceiving teacher's politeness as a motivating factor in any particular situations between males and females?

Below is Table 5. which exhibits group statistics in terms of males and females and their respective Means in particular situations related to teacher's politeness as a motivating factor. The condition for all situations was "I feel motivated if..."

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
I come in late to class and start talking to my friend. The teacher looks at me but does not say anything.	Male	18	3.17	1.150	.271
	Female	10	3.30	1.059	.335
I ask the teacher what we are doing in class and she answers.	Male	18	2.28	1.364	.321
	Female	10	1.20	.422	.133
I keep talking to my friends and the teacher doesn't warn me.	Male	18	3.33	1.085	.256
	Female	10	3.20	1.033	.327
The teacher always tells jokes.	Male	18	1.94	.998	.235
	Female	10	1.30	.675	.213
The teacher doesn't criticize talkative students in front of everybody.	Male	18	2.67	1.283	.302
	Female	10	3.00	1.333	.422
The teacher always smiles.	Male	18	2.67	1.029	.243
	Female	10	2.00	1.247	.394
The teacher always gives positive examples.	Male	18	2.06	.725	.171
	Female	10	1.70	.823	.260
The teacher never corrects me in front of my classmates.	Male	18	3.33	1.029	.243
	Female	10	3.30	.823	.260
The teacher gives examples related to my culture.	Male	18	1.94	.639	.151
	Female	10	2.10	.876	.277
The teacher doesn't get angry very easily.	Male	18	4.28	.669	.158
	Female	10	4.20	1.033	.327
The teacher says 'Hi!' when she sees me outside the classroom.	Male	18	2.56	1.294	.305
	Female	10	1.30	.483	.153
The teacher never interrupts me when I am talking in front of the class.	Male	18	2.67	1.085	.256
	Female	10	2.00	1.247	.394
The teacher doesn't	Male	18	2.00	.970	.229

laugh when I make a mistake.	Female	10	1.10	.316	.100
The teacher taps me on the shoulder when I do something good.	Male	18	2.39	.850	.200
	Female	10	2.40	1.265	.400

Table 5. The Group Statistics between males and females in perceiving teacher's politeness as a motivating factor in particular situations.

In the table below (Table 6.), we can see the results of the Independent Samples T-test which generates significant difference between males and females in perceiving teacher's politeness as a motivating factor in particular situations.

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
I come in late to class and start talking to my friend. The teacher looks at me but does not say anything.	Equal variances assumed	.002	.965	-.302	26	.765	-.133	.442	-1.041	.774
	Equal variances not assumed			-.309	20.091	.760	-.133	.431	-1.032	.765

I ask the teacher what we are doing in class and she answers.	Equal variance s assumed	13.55 2	.00 1	2.41 8	26	.023	1.078	.446	.162	1.994
	Equal variance s not assumed			3.09 7	22.11 7	.005	1.078	.348	.356	1.799
I keep talking to my friends and the teacher doesn't warn me.	Equal variance s assumed	.341	.56 4	.317	26	.754	.133	.421	-.732	.998
	Equal variance s not assumed			.321	19.52 7	.751	.133	.415	-.733	1.000
The teacher always tells jokes.	Equal variance s assumed	.322	.57 5	1.81 6	26	.081	.644	.355	-.085	1.374
	Equal variance s not assumed			2.02 9	24.78 8	.053	.644	.318	-.010	1.299
The teacher doesn't criticize talkative students in front of everybody .	Equal variance s assumed	.069	.79 4	-.650	26	.522	-.333	.513	- 1.388	.721
	Equal variance s not assumed			-.642	18.10 9	.529	-.333	.519	- 1.423	.756
The teacher always smiles.	Equal variance s assumed	.036	.85 1	1.52 4	26	.140	.667	.438	-.233	1.566
	Equal variance s not assumed			1.44 0	15.89 1	.169	.667	.463	-.315	1.649

The teacher always gives positive examples.	Equal variance s assumed Equal variance s not assumed	.990	.329	1.185	26	.247	.356	.300	-.261	.972
				1.142	16.784	.270	.356	.311	-.302	1.013
The teacher never corrects me in front of my classmates .	Equal variance s assumed Equal variance s not assumed	.764	.390	.088	26	.931	.033	.380	-.747	.814
				.094	22.449	.926	.033	.356	-.704	.770
The teacher gives examples related to my culture.	Equal variance s assumed Equal variance s not assumed	.436	.515	-.540	26	.593	-.156	.288	-.747	.436
				-.493	14.447	.629	-.156	.315	-.830	.519
The teacher doesn't get angry very easily.	Equal variance s assumed Equal variance s not assumed	1.849	.186	.242	26	.810	.078	.321	-.582	.737
				.214	13.304	.833	.078	.363	-.704	.859
The teacher says 'Hi!' when she sees me outside the classroom.	Equal variance s assumed Equal variance s not assumed	8.108	.008	2.937	26	.007	1.256	.427	.377	2.134
				3.682	23.776	.001	1.256	.341	.551	1.960

The teacher never interrupts me when I am talking in front of the class.	Equal variance assumed	.031	.862	1.478	26	.151	.667	.451	-.260	1.594
	Equal variance not assumed			1.418	16.600	.175	.667	.470	-.327	1.660
The teacher doesn't laugh when I make a mistake.	Equal variance assumed	10.502	.003	2.830	26	.009	.900	.318	.246	1.554
	Equal variance not assumed			3.606	22.565	.002	.900	.250	.383	1.417
The teacher taps me on the shoulder when I do something good.	Equal variance assumed	1.323	.261	-.028	26	.978	-.011	.400	-.832	.810
	Equal variance not assumed			-.025	13.626	.981	-.011	.447	-.973	.951

*The mean difference is significant at the 0.05 level.

Table 6. The Significance between males and females in perceiving teacher's politeness as a motivating factor in particular situations.

RQ3 : Is there a difference in perceiving teacher's politeness as a motivating factor between Turkish and Bosnian students?

The table below shows the Group Statistics in which the Means of two national groups are being compared (Table 7.)

Group Statistics					
	Nationality	N	Mean	Std. Deviation	Std. Error Mean
Politeness	Turkish	20	45.4500	3.61976	.80940
	Bosnian	8	43.0000	2.39046	.84515

Table 7. The Group Statistics of Turkish and Bosnian participants.

In Table 8. we can discern the output of the Independent Samples Test performed for the sake of identifying the difference in perceiving teacher's politeness as a motivating factor between Turkish and Bosnian subjects.

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Politeness	Equal variances assumed	1.312	.262	1.757	26	.091	2.45000	1.39458	-.41660	5.31660
	Equal variances not assumed			2.094	19.642	.049	2.45000	1.17022	.00610	4.89390

*The mean difference is significant at the 0.05 level.

Table 8. The Significance between Turks and Bosnians in perceiving teacher's politeness as a motivating factor in particular situations.

7. Discussion

As revealed in the Literature Review chapter, findings of previous studies on the effects of teacher's politeness on students' motivation demonstrate a positive and meaningful relationship and that the impact is definitely present (Brown and Levinson 1987; Matsumoto 1988; Mills (2003), etc.). This study also produced similar results in terms of the existence of the relationship between teacher's politeness and students' motivation. However, what this study focused on was identifying whether there is difference in the perception of the teacher's politeness as a factor arousing motivation in students among gender and nationality groups in certain situations which were defined by the statements in the questionnaire.

The Independent Sample Test in which the computed variable Politeness was compared to the grouping variable of Gender showed that there was no significant difference among males and females when it comes to perceiving teacher's politeness as a motivating factor. Thus, the first hypothesis is accepted. This result is not surprising since it would not be logical to contend that

either males or females do not 'like' or 'favor' teacher's politeness or they do not regard it as a factor contributing to their motivation. However, this study went one step further to examine other differences present in the perceptions of males and females in this study.

As explained in the Literature review section, politeness is not an empirically exact concept. It is rather a broad term that can be defined from different perspectives and by different examples. Due to its changing nature, I decided to explore the differences between males and females in their perception of teacher's politeness as a motivating agent in particular, specific, clearly defined situations. For the sake of that endeavor I performed the Independent Samples Test on isolated situations on males and females and I got surprising results. There are indeed several significant differences between males and females in their perception of teacher's politeness as a contribution to their motivation so the second hypothesis is rejected.

For instance, in the following situation: "I feel motivated if I ask the teacher what we are doing in class and she answers" revealed that the significant difference for males was Sig. 2-tailed=0.023, whereas for females Sig. 2-tailed=0.05. This shows that males and females do not feel equally or do not feel at all motivated when the teacher answers the proposed question and thereby demonstrates politeness towards the student. This may be rooted in the fact that males and females perceive differently the teacher's immediacy level, i.e. whether the teacher is outspoken and responsive and whether the teacher is of the same gender as the student so the student feels more or less comfortable asking direct questions.

Moreover, in the situation "I feel motivated if the teacher says 'Hi!' when she sees me outside the classroom" males and females responded differently. The significant difference for males was Sig. 2-tailed=0.007 and for females Sig. 2-tailed=0.001. This outcome is, in my view, due to different perceptions of the necessity of communicating with the instructor outside the learning environment. I do not want to derive far-fetched conclusions but as a teacher at the institution where this study was conducted, I personally believe that female students are more apt to interact with the teacher outside the classroom because they feel more confident in class if they know that they maintain communication with the teacher outside the learning ambience.

Another situation that exhibits the significant difference in opinions is the following: "I feel motivated if the teacher doesn't laugh when I make a mistake." The significant difference for males is Sig. 2-tailed=0.009 whereas for females it is Sig. 2-tailed=0.001. From my experience as both a student and a teacher, I claim that males are more prone to ostentatious reactions in class than females and this is why we witness the existence of the significant difference between males and females in reacting to the aforementioned situation. Males do not feel as uncomfortable as females when being laughed at making a mistake. Males tend to participate in the laughter in order to hide the damage to their self-esteem whereas females are generally more self-conscious and understand laughing at their mistakes as a sign of serious humiliation. Of course, this is a slippery slope and in order to avoid hasty generalization I have to say that this is open to interpretation.

Therefore, despite the fact that majority of the situations that depict teacher's politeness as a motivating factor in the questionnaire were almost equally perceived by the participants with no significant difference, we still have to reject the null hypothesis that claims: "There is no difference among males and females in perceiving teacher's politeness as a motivating factor in isolated, particular situations" because there are three out of fourteen situations that prove the opposite.

When it comes to comparing the Means of Politeness as a computed variable and Nationality as a grouping variable, Table 8. clearly shows us the existence of a significant difference between Turkish participants and Bosnian participants. Sig. 2-tailed is obviously less than 0.05 and it brings about rejection of the third hypothesis. Moreover, if we compared Means between Turks and Bosnians, we deduce that Turkish students are the ones who regard teacher's politeness as a motivating factor, more than Bosnian ones. This is a rather expected outcome since I am quite acquainted with the cultural differences between the two nations. These findings are ostensibly a cross-cultural matter.

Whether an interruption of a talkative and disruptive student is a polite thing or not different national groups perceive it differently. Even though in the beginning of this paper two definitions of politeness were provided in order to reconcile the cultural differences we still could discern the subtle divergences in both definitions and in the final results. Generally, cross-cultural differences should inevitably be taken into account when performing and analyzing tests on politeness and similar socio-psychological traits. This was also proposed by Matsumoto (1988) who extended the B&L theory claiming that the same rules do not apply on the same mentalities.

8. Conclusion and future perspectives

Even though this study was performed on a rather small sample, if we consider it in relation to the entire university then the sample is only relatively small. Yet, its significance and contribution to further research in the academic community are not negligible. The concept of politeness may be regarded from various perspectives and its multidimensional nature brings about differences in interpretation. Still, what almost 99.99% of people in the world would agree is its positive influence. However, the greater the nuances in interpretation of the meaning of politeness the greater are the differences in analyzing its correlations and influence. It would be rather surprising to encounter that there is a difference in perceiving politeness as a positive, motivating factor in a foreign-language classroom. However, what remains to be discovered is what those differences imply and how they correlate with the subjects/participants.

This study performed a detailed analysis of how particular nuances in teacher's politeness affect opposite genders. We learned that it is not that simplistic after all. This is why I contend that this study is relevant for further research. It provides an insight into what makes males and females deviate from a common stance that teacher's politeness influences their motivation. If this field were further analyzed, teachers and scholars could tailor their motivational strategies in a more custom-made manner, one that would suit the needs of their students both male and female. It is

inevitable that gender differences matter in the classroom and if teachers were to be more effective in arousing motivation, they ought to go one step further.

Likewise, the differences between Turkish and Bosnian nationalities displayed in this paper are not an isolated case because they provide a proof that politeness is not a term general in itself. It is not something identically defined in all cultures in the world. It is a sensitive concept that deserves a thorough study and attentive cogitation. This case is relevant to the scientific community that is not just interested in the differences between EFL students of Turkish and Bosnian origins. It is also pertinent to a much wider community which seeks to identify the importance of considering those differences as crucial in coming up with fresh motivational strategies in an EFL classroom, paying a lot of attention to politeness. Furthermore, since the Bosnian scientific community is being enriched by international assets from academic staff to students, this study can be of importance in that respect as well and it can provide at least one way of looking at the phenomenon of politeness inside a language-learning classroom.

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In the Mouse's Shoes

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ABSTRACT

This paper undertakes a psychoanalytic literary interpretation of Roald Dahl's popular children's novel *The Witches* (1983) in order to explore how Dahl addresses the theme of death and closure in a book for children. It will be explored how he approaches the main protagonist's coping with grief during the mourning process. The objective of this presentation is to examine the use of unconscious motives as a means of characterisation and narrative organisation in Dahl's depiction of the central character's childhood trauma and how the author creates an atmosphere of the uncanny which in turn affects the protagonists' perception of the world. The psychoanalytic paradigm used in this presentation will be based on Sigmund Freud's concept of unconscious in the dream work which was hypothesised in his lectures on dreams presented in *A General Introduction to Psychoanalysis* in 1920. This paper aims to emphasise that studying children's literature can contribute to the training of English language teachers and promote reading in English amongst students.

The Witches

This presentation will focus on *The Witches*, a popular children's novel written by Roald Dahl in 1983. One of the most prominent themes in the story is death. From the very beginning to the end of the story death keeps threatening to intervene. The car accident in which the boy-protagonist's parents are killed is the point of departure, while the rest of the story is a journey negotiating death threats, violence and execution, resulting finally in an ecstatic victory of life over death. I will concentrate on Dahl's literary techniques used to create the uncanny for the readers and also for the main protagonist who, in order to resolve emotional conflicts arising from involuntary separation from parents, opts for escapism in form of daydreaming, dreamwork and a game of make-believe. I want to propose today that confrontations with death or death threats empower the boy protagonist to overcome the fear of his own death and to come to terms with the loss of his parents through the process of mourning.

Dahl incorporates the themes of death, grief and closure into the frame of a modern fairy tale with some tropes of the genre: there is a hero – a boy who becomes an orphan; there is a villain, the Grand High Witch, who has no scruples and hates children, and who leads a host of like-minded wicked witches; there is an accomplice – the boy's grandmother who helps the hero accomplish his heroic deed and also acts as a wise old woman, a stock character of fairytales; and there is an antagonist – a boy named Bruno, who has the parents that the protagonist lacks, but who lacks everything else the hero possesses – wit, courage, resolution, love, understanding and support of his family, through the figure of the grandmother. The hero is blessed with such virtues which place him on the side of good to win over evil, so that the reader will sympathise with him, in accordance with the philosophical and moral stance of the fairy tale.

In the plot, the boy gets turned into a mouse by the witches but then, with the help of his grandmother, manages to perform a heroic act, spoils the witches' plan and the evil witches meet their deserved end in accordance with a traditional fairy tale moral. However, the ending of the story is a departure from the tradition: the boy does not return to his human form, his life span is abbreviated to that of a mouse and there is a likelihood that he will not outlive his grandmother. Neither does he return home.

What is the uncanny in Dahl's story and how is it created?

In his 1919 essay, *The Uncanny*, Freud defined the uncanny, or “unheimlich, as “that species of the frightening that goes back to what was once well known and had long been familiar”. In Freud's formulation, the uncanny describes something that is strange and frightening, but simultaneously comforting in its familiarity. Dahl draws on the uncanny in two important ways in *The Witches* – in his treatment of death and his presentation of the witches. Death is uncanny in its essence – everybody knows about it but nobody really understands it and it is embedded in human unconscious as one of the greatest human fears. The essential condition for the emergence of a sense of the uncanny is intellectual uncertainty. By presenting witches as real, ordinary women from school, work, or neighbourhood, and assigning them with magic powers, Dahls constructs an image which produces the effect of ambiguity whether the story is real or imaginary. Adrienne Gavin refers to the notion of uncanny in *The Mystery in Children's Literature*, and contends that the uncanny can be traced in everyday life, however, what can be perceived as magical and mysterious or real, or really magical, depends on how a person interprets it.

Uncanny for the reader

Dahl uses elements of magic realism, which is a literary genre which presents the extraordinary as everyday occurrences, to create the uncanny in the novel. In order to to engage the reader and achieve trustworthiness, Dahl employs several techniques, such as: presenting the information in as-a-matter-of-fact manner, using the first-person voice, and the second-person voice in the narrative.

Firstly, he creates the atmosphere of uncertainty as the information about something from the realm of fantasy is delivered in an all-knowing and authoritative, credible manner. From the introduction, readers learn that “In fairy-tales, witches always wear silly black hats and black cloaks, and they ride on broomsticks. But this is not a fairy-tale. This is about REAL WITCHES” (p.7). Susan Engel discusses how children often construct different levels of reality when they create their own narratives, and explains that in the end it is up to the listener to discover the boundaries of real and magical worlds. Dahl takes the stance of a child who in order to create a scary story presents magical as real and the sense of uneasiness starts to build up when these fluid boundaries between the two overlap.

By using another technique, the self-insertion, Dahl intentionally introduces himself into the story as a character and uses the spatial and temporal proximity of the first-person narrative voice to engage the reader in form of a dialogue, even though the reader's response is absent and

impossible to be obtained. „Kindly examine the picture opposite. Which lady is the witch? That is a difficult question, but it is one that every child must try to answer.“ (10) Howard Sklar argues in *The Art of Sympathy in Fiction* that this technique is used to close the distance between the narrator and the audience and to create empathy for the protagonist. Dahl creates the uncanny from the correlation between the protagonist's assertiveness and the reader's emotional involvement with the protagonist in which the child-reader's perception of reality is challenged. The reader learns that the opposite from what is expected might be happening, that even a „lovely teacher“ reading this story to him or her might be a witch herself, although it may be unlikely, but „*not impossible*“(10).

The uncanny is further reiterated through the second-person narration, when the grandmother tells the story about the witches to the main protagonist through her point of view, and the probability of the occurrence of strange events in relation to the reader is increasing. „There are witches everywhere. There's probably one living in our street this very moment.“

As the reader reaches the end of the story, however, it remains unclear whether the narrator at the beginning of the story was an „all-knowing“ adult, or the boy-protagonist. Although the rhetoric style of the first few pages seems different from the rest of the story told in the first-person narrative voice, one can sense that the narrator in both parts is the same person who has matured on the journey of experience. Having succeeded in winning over the witches and having gained the knowledge from his grandmother and through his own experience, the boy protagonist feels obliged now to share it with the the reader. The uncanny subdues as the reader's confidence how to deal with imaginary situations like these increases.

Uncanny for the protagonist

To create the uncanny for the boy-protagonist, Dahl presents the grandmother as a person of trust who „made it very clear to me [the protagonist] that her witch stories, unlike most of the others, were not imaginary tales” (14) because they are told from the point of view of an expert since she is a Norwegian, and “the Norwegians know all about witches, for Norway, with its black forests and icy mountains, is where the first witches came from.” (12)

Arguments for the credibility of her stories are constructed on detailed information what allegedly happened to children of the boy's age, and also by giving realistic names of people – where they lived, who their parents were, and so on.

The boy tries to question the absurdity of the grandmother's claim that the witches would kill all children in England only because they smell like dogs' droppings: “But that doesn't make sense, Grandmamma.” (27) However, the grandmother's authority and expertise are solid and irrefutable. „There's no point in arguing about it...It's a fact of life.“ (28)

Freud referred to the subject of the „uncanny“ as something which arouses dread and horror. Dahl employs diction, similes and metaphors to instill such feelings and invoke senses, in particular those of smell, hearing and sight. When describing the first encounter with the Grand High Witch, the boy-narrator compares her to a living corpse, whose face looks „as though it had

been pickled in vinegar“ and which evokes „something foul and putrid and decayed“ and „a voice that filled the room and bounced around the walls“ (66/67). This exaggeration of sensual experiences is threatening because it is associated with unpleasant experiences the boy narrator had spoken about earlier in the story: „Her voice, I noticed, had that same hard metallic quality as the voice of the witch I had met under the conker tree“ (68). The memory of something familiar is intertwined with the new experience which „was monstrous“, which „was unnatural“ (70), which generates apprehension and the feeling of uncanny for the main protagonist.

Coping with grief

Taking the child's stance in the narrative, Dahl tells the story about the boy who was only seven when his parents were killed. Neither the boy nor his grandmother talk about the tragedy. „I won't go into the horrors of that terrible afternoon. I still get the shivers when I think about it.“ They both cry on the first night after the event and „in order that we might both try to forget our great sadness, my grandmother started telling me stories.“ However, as they do not talk about the tragedy, the boy represses his own traumatic near-death experience, and also his anger and pains caused by the separation from parents. In order to feel safe and protected again, he creates a world in which he vents his suppressed conflicting emotions of love and hatred, in which he distorts the image of his mother and transforms her into a witch who gets punished, but not by himself. Escapism in form of daydreaming, dream-work, and a game of make-believe fulfills the boy's wish to feel safe and protected again. The analysis of the main conflicts in Dahl's narrative will lean on Freud's theory on dream work presented in his 1920 work, *A General Introduction to Psychoanalysis*.

Day dreaming

In his essay *Creative Writers and Day-Dreaming*, Freud compares creative writing with daydreaming as daydreams are conscious formations constructed during the waking state, but which are driven by the unconscious motives. The common feature in both daydreams and dreams is that it is a wish which needs to be fulfilled.

In Dahl's narrative, the boy daydreams of being a hero. While playing with his pet mice, hidden behind the screen as the hotel manager forbade the boy to bring his mice out of his hotel room, the boy imagines becoming a world famous owner of mice-acrobats. „I was beginning to picture myself travelling first-class all over the globe with my Famous White Mouse Circus, and performing before all the crowned heads of Europe.“ (60)

Hearing voices from the background interferes with his daydreaming thoughts and triggers the fear of punishment for playing with the mice against the manager's orders, and seeing female guests fitting the description previously rendered by his grandmother, leads to the boy's substitution of the women with witches in his fantasy. The boy-protagonist's day-dreaming latent thoughts of becoming a hero and the fear of punishment serve as a precursor for his dream work which follows when, after being panick-stricken, he loses consciousness and faints.

The boy-protagonist's dream work

In the chapter *The Meeting*, the screen behind which the boy is hiding serves as a shield and the boy occupies a safe, protected space, where he can see or hear, but remain invisible and protected from the threats posed by the outside world. However, by crossing over the barrier – when the screen is removed – the boy is taken by surprise, loses control and returns to his inferior position in life as a child. Unable to confront the authority and the power of the adults' world, he retrieves all other witches-related information stored in his memory:

“At that point, I think I fainted. The whole thing was altogether too much for a small boy to cope with. But I don't believe I was out for more than a few seconds, and when I came to, I was lying on the carpet and I was still, thank heavens, behind the screen. There was absolute silence all around me.” (64)

From this point on, Dahl constructs the dream-like narrative in which the protagonist's repressed pain from being an orphan, fears of dying, frustrations from being lonely and bored in the hotel, and threats made by the hotel manager, are all condensed and modified in the manifest content of the dream.

The protagonist fuses the witches into the image of one representative of the kind. The witch does not bear a name, only the position: she is *The Grand High Witch*. She holds the supreme rank, similarly to the position the mother held in the boy's world. The boy-protagonist expresses his horror of looking at the witch which has “a look of serpents” with “so crumpled and wizened, so shrunken and shrivelled” face (66). The witch is compared to a corpse because her figure radiates

“something foul and putrid and decayed. It seemed quite literally to be rotting away at the edges, and in the middle of the face, around the mouths and cheeks, I could see the skin all cankered and worm-eaten, as though maggots were working away in here.” (66)

Although the sight of the creature is revolting and her voice is metallic, harsh, of uneven modulation, he is still “magnetized by the sheer horror of this woman's features.” (66) The influence of his mother's or grandmother's Norwegian accent onto their English speech is modified in the dream because “there was some sort of a foreign accent” (69). According to Freud, the speech that features in a dream is often an imitation of something heard during the day. Dahl's play with the language the witches speak in the boy-protagonist's dream adds to a humorous (for the reader) but also frightening (for the protagonist) atmosphere of the boy's dream-work.

As Margery Hourigan suggests, the witches represent both the external threat and also the hero's inner fears and passion. The hero's conflict with the witches can be interpreted as „a symbolic struggle to control his own violent and irrational impulses“. (*Deconstructing the Hero*, 115) Having lost both parents, the boy-protagonist's desire to punish happy children who still have their parents is projected on the witches under a pretext that they have to do it because clean children smell like dogs' droppings.

In the climax of the dream-story, from being a small, helpless boy-mouse, the boy-protagonist becomes a hero in the dream. He takes the responsibility for the decision making and prepares for self-sacrifice for a higher goal: to save all the children in England from the wicked witches. He conjures a plan to pepper the witches' food with their own mouse-action potion and transform them into mice. The position of power changes as the witches consume it and the potion sets to work. The boy-protagonist is growing out of his fears as the cause of the fear is diminishing in front of his eyes. „They're shrinking just like I did!“ In his dream, however, the boy-protagonist does not kill his own mother-turned into a witch-turned into a mouse, and by transferring the responsibility onto the third party, he remains a good son, maintains his innocence in the act and his own clean consciousness. By assigning this task to the hospital staff, the boy-protagonist fulfills another wish laying in his unconscious - to have a revenge for the maltreatment caused by the hotel manager, who represents the body of all the hotel employees.

The conflict, however, only partially resolves as the main protagonist remains in a mouse's shoes and the fear that he would be left an orphan again is evident. He wishes to remain in care of his only living relative – the grandmother: „I couldn't stand being looked after by anybody else.“ (196) The wish fulfillment comes in form of a short life-span of a mouse. According to his grandmother's expertise on mice, an ordinary mouse lives three years, and a mouse-person, which was the boy's metamorphosis in the dream, can expect to live three times longer. For a seven-years-old boy, to live for nine years seems a long time; nevertheless, the likely option for the resolution is that he and his grandmother would both die together.

The narrative continues with the boy-hero's grandiose plans to destroy the witches' organisation in the world by employing cats to kill the witches transformed into mice. Dahl does not end the novel with a traditional closure of a dream-story in form of „and he woke up“ to suggest that the dream is still being constructed and that the magic continues.

Make-believe play

In his 1928 study of development of children's cognitive abilities, the Swiss psychologist Jean Piaget observed young children playing make-believe games and concluded that they often use syncretism and imitation to condense unrelated events or circumstances and generate new ones. The structure of Dahl's narrative comes to the point of divergence when the events following the boy-protagonist's synapse can be interpreted both as his dream, or as his game of make-believe. If the latter view is considered, then it can be argued that the boy imitates the life-threatening circumstances which he had experienced, deploying them in new death-life situations which are syncretised in the witches. In form of a game, the protagonist articulates his repressed fears and frustrations and also creates solutions for imaginary conflicts.

This narrative shift occurs when the lonely boy-protagonist meets Bruno, another boy spending his summer holiday in the hotel. Although the narrator describes Bruno as a gluttonous and sadistic boy, he is also jealous of him because he „never stopped boasting about how his father made more money than my father and that they owned three cars.“ The boy protagonist includes Bruno in his make-believe game and makes him the first victim of the witches' magic. However,

Bruno's imagination in the assigned role is limited: „Don't be a fool,“ he said. „I'm not a mouse.“ (120) „I refuse to be a mouse! I'm Bruno Jenkins.“ (121)

When the boy-protagonist returns to his hotel room, he continues the game with his grandmother. He creates the story about the witches in the meeting room. In order to continue the game, he must invent new events. Therefore, the witches turn him also into a mouse, and he assumes this role with all sincerity of a make-believe play. „I got the shock of my life when I heard my own voice, my own perfectly normal rather loud voice, coming out of my tiny mouth.“ (118) The grandmother takes the game seriously and constantly praises the boy-protagonist for his wits and skills. When he reveals his plan to turn all the witches into mice, she cries: „What an idea! It's fantastic! It's tremendous! You're a genius, my darling!“ (134)

However, the grandmother crosses the boundaries of the intimate play between the boy actor and herself when, using the boy's pet mice as props, she decides to extend the game onto Bruno's parents, who do not share her enthusiasm. They think she is mad. „Get out of here! How dare you frighten my wife like that! Take your filthy mouse away this instant!“ shouts Bruno's father at her. (153) Then, the grandmother and the boy release mice-actors in the kitchen. Adult hotel guests are not entertained with such development of events, while children find the chaos, as a break from the ordinary boring hotel routine, hilarious.

The story ends with the boy's future planned actions aimed at annihilating the witches. In his fantasy, the boy releases his repressed anger as a manifestation of his involuntary separation from parents, and by playing a game about the quest against the witches, he learns that he is loved unconditionally by his grandmother, and that she is there to support him.

How can studying children's literature contribute to the training of English language teachers?

Reading fairytales and fantastic stories is the way for children to see how protagonists cope with disturbing situations and resolve conflicts arising from them by generating ideas for solutions and turning problems to their advantage. Readers who embark on such a journey can make progress and come out with new insights about themselves and about the world around us. Roald Dahl's stories are full of these real-life-fantastic elements, which contributes to their appeal to the readers.

As much as knowing another language can assist teachers to perceive unique characteristics of that language and share the relatedness of these characteristics with other languages, the teacher who is equipped with the content knowledge of literature in the language taught can assist learners to approach learning of the second language in a way similar to the approaches they have when they were learning their first language – through reading (or listening to) various text types.

Therefore, knowledge of children's literature is particularly relevant to the prospective teachers of English as a foreign language who will work with young learners – from pre-school to high

school students. They can precipitate their students' enjoyment in reading fiction for the same reasons they enjoy doing it in their first language. I strongly believe that inclusion of children's literature in English language in the undergraduate studies of English as a Foreign Language can be beneficial for prospective teachers and their future students.

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The Sounds Of African-American Literature: African-American Literature Through The Lens Of Music

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ABSTRACT

African-American literature is often considered as a sub-category of American Literature. It is often marginalized by directly pertaining to the experiences and viewpoints of African-Americans. Harlem Renaissance is a significant time when African-American writers took pride in their artistic traditions. In order to create an authentic image of themselves, they also created remarkable standards in their literature and art. A new tradition, which changed the well-established boundaries of literary creativity, was gaining its full recognition among African-American writers. The aesthetics of Blues and Jazz was having a major influence in African-American literature of the twentieth century. This paper will investigate the effects and uses of Jazz and Blues aesthetics in African-American literature by attempting to answer how the aesthetics was manifested in characters, structure and themes that many African-American writers promoted in their literary work, and if incorporating music to their literary works worked as bridge to join African-American literature to wider public debate.

Key words: Jazz, Blues, African-American literature, Harlem Renaissance

I. The Concept of Harlem Renaissance.

Harlem Renaissance is long considered the Mecca of African –American culture. Nevertheless, Harlem proved to be a strong concentration of diverse elements of people from many parts of the world, not only an African-American experience. It attracted people from Africa, West India, Europe and many people from different fields of life.

By shifting the concept from “Old Negro” into the “New Negro”, many African- American intellectuals desired to alter the concept of “Old Negro”. The concept of being African-American had always been related to social discrimination and fear. African-Americans had been described more based on some stereotypes rather than for what they really were (Locke et al. ,1925, p.3) Consequently, the “Old Negro” was convinced to see oneself inside this prism and, as a result, there was little chance of acquiring a true understanding of one’s real self.

A misconception of the “Old Negro” required for a re-orientation toward something new and more real- something that described the most quintessential aspect of an African-American life. In this way, the New Negro became a new way of thinking; a way of discerning the position that an African-American constituted in the USA rather than what he was made to believe for years.

This re-evaluation of the way a “New-Negro” thought was a kind of feeling that came from within; something that was free from any outside influence. (Locke, 1925, p.4)

The “New-Negro” had to find the way to channel the new self-expression and a worthy approach to achieve it was through music and literature. The bond that bounded African- Americans together with people from other parts of the world was a strong one. A bond that united them in a common problem, namely the race. It enabled them to reconstruct the problem. Race was a name rather than a fact for many African-Americans. Harlem was a place of group-expression focusing on feeling toward life, past and future. As aforementioned, the purpose of many Harlem Renaissance writers was not only to reexamine their true self but also express their viewpoints on future. It otherwise became, as Lock pointed out, a *race capital*. It enabled them to think what was theirs and what was bogus. It helped them not only become a whole strong body of equally-minded people who were struggling not only to make African-American literature worth of American literary cannon but also empower African-American literature to contribute and enrich the American literature and art.

The “New Negro”, while changing perspective, was in a constant inner race while moving toward the objectives that had been set. According W.E.B Du Bois, the New Negro was in a double-consciousness. In Du Bois' thought, it is the veil that grants Black Americans a double-consciousness (Du Bois, 2008). It is the feeling of non-belonging that mostly worried Du Bois. The feeling of not belonging, even to one's home, and looking oneself through the eyes of another as “One ever feels his twoness,—an American, a Negro; two souls, two thoughts, two unreconciled strivings; two warring ideals in one dark body” (Du Bois, para 3). Nevertheless, this strive was not all lost. Du Bois pledged to obtain the self-consciousness and empower African-Americans to regain their true best representation of themselves by being African and American at the same time without being judged by the color of their skin. Consequently, America would also benefit from African- Americans since cooperation would finally implore for a better America. However, it is this double- consciousness that made many African- Americans not capable of fully excelling in some fields of life since they were torn between the ideals of an African-American and the ideals the white society had imposed to them (Gutenberg, 2008). Through these trials and errors, African-Americans managed to see behind the veil the true value of themselves- managed to revalue their self-respect and self-realization. Only in this way America would be able to appreciate the true conformity to American ideals: Work, culture, liberty,—all these we need, not singly but together, not successively but together, each growing and aiding each, and all striving toward that vaster ideal that swims before the Negro people, the ideal of human brotherhood, gained through the unifying ideal of Race; the ideal of fostering and developing the traits and talents of the Negro, not in opposition to or contempt for other races, but rather in large conformity to the greater ideals of the American Republic, in order that some day on American soil two world-races may give each to each those characteristics both so sadly lack. (Du Bois, 2008,para. 12)

E.Bowen (1895) in his “An appeal to King” had the same idea about the cooperation among races in America. For Bowen, the veil was a king, an invisible one, who exerted power and

control. Nonetheless, the revolution of morals had begun. The changes that the “New Negro” was undertaking were changes that would give positive changes in the society. Bowen also believed that the race problem was also of a wider range and one could not only focus on the race problem in America. He believed that the Negro should also encompass a wider definition—a human race problem (27). Bowen also acknowledged that the Negro was also seeking to define himself among other men in America. In this way, America could go toward a homogeneity in sentiment and this sentiment would enable any men develop one’s ability to do good in society(28). It was a plea for good education, for the betterment of living conditions and, consequently, for a better status in American society. In order to acquire a distinctive voice, many American writers had to find a distinctive form of expression to show their authentic voice in American literature.

II. Characteristics of Negro Expression.

According to Zora Hurston (1997) the characteristics of Negro expression included the use of simile and metaphors, the use of double-descriptive as well as the use of verbal nouns (57). Asymmetry was another important of African American literature and art. As music relied on improvisation and deepest feelings emerging in notes, each unit had a rhythm but as a whole it was asymmetrical (60). Music, literature and art were a means to escape the chains of past, to free the soul and turn sentiments into golden words with almost sacred words for African-Americans. Spirituals were the utterance of pain and suffering, Blues chiseled true feelings while Jazz incorporated soul and body into a truly genuine voice.

Another important influence in the writing of many African-American writers was also the blues and jazz aesthetics. In order to obtain and solidify a unique voice of their own, many African-American writers were influenced by the techniques and styles of Blues and Jazz. Langston Hughes managed to include both Blues and Jazz in his writing in assembling the Blues notes and the Jazz improvisation into a single voice.

An important facet of Blues aesthetics was double-entendre. Oftentimes, Blues is related to sadness, pain and suffering. Nevertheless, double-entendres are most times associated with aspects of sexuality in Blues. African-American writers took double-entendres and gave them acceptable and respectable connotation for the society. Travel themes played an important part in many blues song. As in Ma Rainey “Walking Blues,” (1923) women had to walk, to survive and make it. There was no turning back. The woman had to go on with her life and sing the Blues. Bearing no more the longing for a beloved one, the independent living and discovering the world alone by travelling, the travelling of the older generations as slaves from other countries, the search of freedom as a long “travel” toward equality were topics chosen and elaborated by African-American writers.

Another important element of African-American literature was repetition. As in “Cross Road Blues,” (1936) Robert Johnson intensifies his inner feelings by using the metaphor of crossroad

“.....I went down to the crossroad, fell down on my knees”. Writers used repetition as to intensify an emotion, a feeling. In “Weary Blues” (1987) Hughes repeats, “Ain’t got nobody in all this world, Ain’t got nobody but ma self.” where he portrays his inner struggle to succeed in a society in which he is practically alone.

A Blues Couplet, used by many Blues singers, consists of twelve bar blues, mainly of 3 lines where the first line is repeated in the second while on the third the improvisation takes place. The rhyme usually consists of AAB as in “St. Louis Blues” (1914):

Oh, that St. Louis woman with her diamond rings
She pulls my man around by her apron strings
And if it wasn't for powder and her store-bought hair

A major technique of Jazz was improvisation. The singer was free to improvise, to give a new version of the same piece of art. The Jazz singers called for a different tune and received a response. The call-and- response technique became a very useful technique in many writings of African-American literature. It enabled many writers to call for some kind of action or revolt and asked for a response from the reader. The message was like a hidden code that only African-Americans could understand and support. Meanwhile, it became very difficult to decipher by others. The message was gaining the qualities of a music coda- an afterthought of what was left from the past and what had yet to come in the future.

Through the lens of Blues and Jazz aesthetics

In “Weary Blues,” (1987) Langston Hughes requested the union between the author and the reader. The musician who was playing the weary blues was not a famous artist. Yet, he succeeded in mirroring the reality of that time. His notes on the keys create the feeling of anticipation and fair. It was fair but also determination to be free and authentic:

With his ebony hands on each ivory key
He made that poor piano moan with melody.
O Blues! (23)

Blues is the sound that moans. It is a revelation from the soul- the soul of an Afro- American seeking dignity. It is the Blues that unites Afro-Americans together to this reality and unites them to sing to it. Blues also inspires them to sing to their past. The piano is a mirror of the pain that is “....coming from a black man’s soul.” (23) Blues is also talent and strength. Blues is embellished with a transformative force which is ongoing and enriches. Music symbolizes a form of freedom, a form of expression and a quest for appreciation. Consequently, Hughes believed that Blues was a mixture of past and present.

Blues represented a rather dimmer picture of the situation in "Tornado Blues," (Brown, 1901):

Destruction was a-drivin' it and close behind was Fear,
Desctruction was a-drivin' it and hand in hand with Fear,
Grinnin' Death and skinny Sorrow was a-bringing' up de rear. (68)

It displayed feelings of destruction, despair and fear. Following the common AAB rhyme as well as repetition, Brown's voice was immediate, looking for an urgent response from African-American community. A voice Bowen and Locke had also acknowledged among African-Americans.

In "Jazzonia," (1987) Hughes depicted Jazz as a new form of expression. He embraced new techniques in his writing such as repetition, rhetoric questions as well as improvisation as quintessential techniques of Jazz. "Jazzonia," represented a story at a cabaret in Harlem whereby six musicians play Jazz music and another Afro-American was sitting watching the show as well as the girl who was dancing to the music. Her beauty is indescribable. Hughes compared her to Cleopatra's beauty and boldness by posing rhetoric questions to the reader in the form of a call-and-response: "Were Eve's eyesJust a bit to bold?" and "Was Cleopatra gorgeous in a gown of gold?"(24). Hughes calls the reader to take pride in what is African-American by constructing in this way what is theirs. Jazz is offered as a bold expression, as bold as the dancer's eyes. It is not only her eyes that are bold. She lifts high the dress of silken gold (24). In this way, Jazz and literature are creating a form of free expression for African-American literature; a free form probably going counter some norms.

In "Cabaret," Hughes intensifies the acceptance and identification of sexuality while in "Jazz Band in a Parisian Cabaret," Hughes offers a more inclusive approach compared to "Cabaret" and "Jazzonia". Jazz is for everyone rich and poor, lords and ladies. It is the music that touches the soul to everyone- the tune cries and laughs at the same time (106).

In "Harlem Dancer" by Mackay one remarks a difference. The dancer is as perfect as in Jazzonia. Her beauty and her movements are beautiful but she has to put "her false smiling face" (1922) in order to please the audience. It is the veil of Du Bois or the mask of Dunbar that somehow makes the dancer stay in between two parts of the game. MacKay believed in the need to break free that wall in order to be appreciated and accepted. In this way, African- American literature would be supported and become an important part of American literature. It was a form of rebellion but also pride and recognition of one's values. As Hughes reflected in "The Negro Artist and the Racial Mountain" (1926) : ". . . the Negro artist offers his racial individuality, his heritage of rhythm and warmth, and his incongruous humor that so often, as in the blues, becomes ironic laughter mixed with tears" (693). Jazz proved to be a new form of expression sometimes getting the form of rebellion or protest. Sometimes it became a single form of individual self-expression.

Conclusion

Many African-American writers shared the common belief that African-Americans had to give their contribution in the American culture and literature. In order to achieve this aim, African-American writers had to choose a new aesthetics that was different from white writers. In this way, they would not only prove their value but also contribute to the enrichment of African-American culture in general and literature in particular. Jazz and Blues aesthetics proved to be very efficient ways in providing the audience with new pieces of writing accompanied by a new style. This quintessential form of expression would enable African-American thought constitute an important part of American literature but it would make them feel proud of their identity and talent.

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Part IV

International Relations

Democracy Promotion through Stealth:

The Use of Free Trade Agreements in Reforming Authoritarian Regimes

Agnesa Karapetyan

Research subject

Since the early 1990s the World Trade Organisation (WTO) believes that over 200 Free Trade Agreements (FTAs) have been signed. With the growth of FTAs has come the explosion of democratisation. The purpose of this investigation is to analyse whether these two phenomena are interlinked. The research topic will examine the role of the European Union (EU) and its use of soft-power for democracy promotion. The analysis focuses on the effects of FTAs on democratisation. In order to comprehend what is meant by democratisation in this enquiry, it is essential to provide a viable definition of this concept, which will be the basis of this analysis. In its simplest form, democracy is rule by the people, or as Diamond (1990) argues “rule by the consent of the governed”. Schumpeter (1950, p. 252) provides a broader definition of democracy, stating “that institutional arrangement for arriving at political decisions in which individuals acquire the power to decide by means of a competitive struggle for the people’s vote”. Rulers are accountable to citizens through their elected representatives. Another definition of democracy is provided by Schmitter and Lynn Karl (1996, p. 53) that democracy

“offers...competitive processes and channels for the expression of interests and values – associational as well as partisan, functional as well as territorial, collective as well as individual.

All are integral to its practice”. A further definition of democracy is supplied by Held (2006, p. 10) “individuals should be free and equal... so long as they do not deploy this framework to negate the rights of others”. By defining democracy in this way Held (2006, p. 10) contends that democracy provides everyone with rights, it provides accountability to the electorate. This is the definition selected by this proposal; it provides an understanding of what democracy is and what democracy does, by its protection of liberties.

The study will analyse the use of FTAs in promoting the economic and political structures of a state. FTAs will be shown to have influence not only economically, but also on democratisation within competitive authoritarian regimes. By using the term competitive authoritarian, the analysis contends that regimes hold elections, but use state institution and the police to make sure

that the election results are known beforehand and the opposition is stifled (Levitsky and Way, 2003).

The study topic has special interests because if FTAs can be seen to promote democratisation, then this would be a new way to promote democracy globally. It is important at this juncture to determine that an FTA is an agreement that removes tariffs, import quota and preferences on at least most goods between states that have signed an agreement. Of course, it does not necessarily need to be states, but on the whole it has been states that have signed these agreements (McRae and Steger, 1988, p. 3). The FTAs provide unrestricted market access, which is mutually economical beneficial. The study will analyse whether the economic gains of an FTA can help strengthen democracy and political stability.

The study will investigate ways that the EU could use soft-power to help implement reforms in post-Communist countries on example of Armenia through the use of an FTA. Armenia will be used as an example as in previous works the researcher has analysed EU and Armenian relations through the spectrum of the Partnership and Co-operation Agreement (PCA) and European Neighborhood Policy (ENP). The research will be analysed by using five case studies to simulate how a potential FTA between the EU and Armenia would affect democratisation in that state. In reference to the example of Armenia the analysis hopes that the possibility of an FTA between the EU and Armenia would modify the oligarchic economy to a more market based economy and also transform the illiberal political regime (Zakaria, 1997).

Research questions and the Hypothesis

Before raising the issue of the hypothesis that the investigation wants to analyse, there are a number of research questions that need to be answered throughout the study that will help in testing the hypothesis. This PhD project will contribute to answering the following questions:

Can FTAs promote democracy building? In other words can FTAs be seen as an opportunity to promote democratisation? If an FTA can be formulated, will states reform to allow the FTA to become operable?

What role does the EU play in the democratisation process? Is the EU only interested in the trade component or other aspects, such as democracy and the rule of law also play a role? Is the EU effective at driving democracy globally?

Can the EU use FTAs as a soft-power option for implementing reforms? Will the use of FTAs by the EU be a continuation of the ENP and a more coherent way of producing stability? What is the role of FTA in the process of democratisation in comparison to other measures?

The study will also inquire into the circumstances and conditions by which closer ties with the EU, in this case an FTA, would improve the economic and political structure in a state.

The hypothesis of the analysis is that FTAs between states and the EU promote reforms in competitive authoritarian regimes to allow the FTA to become operable affecting the economic and political structure of the state which leads to democratisation. In other words, to ensure the equitable redistribution of the gains from trade, FTAs must be supported by a series of complementary policies. Yet, it is quite possible that the result of the analysis could be different and FTA may not have a role to play in democratisation.

Review of the Current State of Research

The investigation is inter-disciplinary using aspects of economics and political science to argue its case. The importance of FTAs on the development of the economy and the promotion of democracy has hardly been investigated in the literature. The literature in the field of economics that does examine this topic focuses squarely on FTAs. In the field of democracy, theories have been expounded analysing the link between a state's growing economy and its eventual democratisation. At best few scholarly works have investigated the link between FTAs and democratisation. The EU is and remains an international actor, with the ability to promote its soft-power throughout states and regions. Studies have looked at various FTAs between states and the EU, but none has investigated whether FTAs can lead to an improvement in both the economy and political institutions of a state and this a very important concept that makes this study original. The dearth of studies on the subject does not do justice to the growing importance of this topic within the fields of economics and political science. The scantiness of the material on the subject does not fit with the growing magnitude of questions such as, if an FTA can be formulated, will states reform to allow the FTA to become operable. Contrary to popular perceptions, FTAs have helped to promote reforms in dictatorial states, witness the preferential trade agreement (EEC regulation number 1524/70 of the Council) on the conclusion between the European Economic Community (EEC) and Spain (1970).

To provide an understanding of FTAs and whether these agreements promote democracy, the analysis will focus on the literature on FTAs and particularly to FTAs and the EU and assess whether this literature corroborates this hypothesis. Yet, a general analysis of FTAs and their effect needs to be investigated. It is not just Governments that shape trade policy, but business interests and national actors have a hand, as businesses in particular, wishes to expand and so pressures governments to create FTAs with other states and even international institutions (Schattschneider, 1935; Bauer, de Sola Pool and Dexter, 1963). It is therefore, a mixture of states wishing to integrate into international institutions and the role of influential domestic state actors that allow states to opt for an FTA (Putnam, 1988). International institutions must negate any back-sliding and promote liberalization (Bailey, Goldstein and Weingast, 1997). If a dictatorial state attempts to integrate into institutions through FTAs, the reform of the economy that is needed to placate the World Trade Organization (WTO) and the EU can change the state from a dictatorship to a fledgling democracy (Haas, 1958; Burley and Mattli, 1993). This bodes well for

an analysis of the EU and its FTAs. The EU has promoted FTAs throughout the world, rather than, concentrate on former colonies of its Members or European non-Member states (McQueen, 2002). Fernandez and Portes (1998) contend that the EU uses FTAs to promote its economic and democratic soft-power. The EU as a rich region has the ability to use soft-power to reform states and open them to trade (Bale, 2008, p. 362). The EU uses trading power to change the political structures of states and wishes to secure its „near abroad“ and „lock in democracy“ (Zielonka,

1998; Bale, 2008, p. 366). The literature on FTAs and regional integration is vast, with scholars having analysed trade flows (Baier and Bergstrand, 2004) and the balance an FTA gives to states (Grossman and Helpman, 1995). Other scholars have argued that geographic proximity is important for an FTA (Frankel et al. 1996; Frankel and Wei 1998; Helpman and Krugman 1985; Wonnacott and Lutz 1989; Bhagwati and Panagariya 1996). Studies have investigated whether these accords are beneficial. So far the data has returned mixed results, with different scholars claiming FTAs are beneficial (Aitken, 1973), insignificant (Bergstrand, 1985), or irrelevant (Frankel, 1997). So far the literature has covered FTAs, but in order to comprehend whether FTAs have a link to democratisation, the investigation will examine the current literature on democracy and economics.

Since the Nineteenth Century scholars have, according to Glassman (1991, p. 65) seen the importance of free market capitalism and liberal democracy. Capitalism provides a middle-class that wishes to reform the state and preserve their interests (Weber, 1906, p. 346; Schumpeter, 1950; Moore, 1966; Skocpol, 1979; Berger 1986; 1992). Hitherto, the study has argued that capitalism breeds democracy, however, as Latin America highlights capitalism does not automatically bring democracy (Diamond, 1993, Waismann, 1992, p. 140-155). Nor necessarily has the middle-class been the prevalent strata of society in enforcing democratisation. Throughout Western Europe, it has been the working-class that has brought democratic reforms (Therbon, 1977; Reuschmeyer, Stephens and Stephens, 1992, pp. 52, 97-98, 140-143).

Regardless of which social strata implements democratisation, the link between capitalism and democracy is real (Huntington, 1991). Lipset (1959) contends that the middle-class will support a system that does not fall prey to extremist politics. It is the middle-class, fearful that extremist politics could affect their earnings, whom are more likely to support a democratic system. As a dictatorship liberalizes its economy, it improves communications and education. Lipset (1959) argues that this is the dictatorship's downfall, by improving people's education it allows people to think for themselves and communications make it harder for the state to control its people. As a country grows economically its social structure changes from a pyramid to a diamond, with the middle-class becoming the largest class, this gives the middle-class a political voice that leads to democratisation (Lipset, 1958). Przeworski (et al, 1996) and Lipset (1959) have emphasised that the economy can promote the extent of democratisation in a state. States begin to democratise once a certain GDP per capita has been reached, but that these states can recede towards authoritarianism or as Przeworski (et al, 1996) noted democracies become “impregnable” once the state has a GDP per capita of \$6,000. The contention put forward here, is that there is not so

much a link between democracy and economic development, but rather, an almost factual correlation, as Muller (1997, p. 133) argues, “Quantitative cross-national research on the economic determinants of democracy consistently finds that a country’s level of economic development is associated positively...with...democracy”. The literature on democracy and markets holds that democracy and capitalism are linked, that it is difficult to have the former without the latter. The literature also argues that states that do not reform do not become democratic.

On the field of this research Xuepeng Liu and Emanuel Ornelas (2011) have discussed that, because of the rent-destructing effect of FTAs, they can help democracy to “consolidate” in a country and has recently published this paper with WTO publications. Their study, though, focuses on FTAs and the consolidation of democracy, an extensive study is not available to date. This dissertation will contribute to closing the gap in the literature by taking post-Communist countries as case studies. There are, however, numerous contributions to the debate that this work will draw and build upon. Helen Milner (2005), for example, argues that democratisation reduces the ability of the government to use trade barriers as a strategy for building political support.

Claude Barfield (2002) addresses the questions of legitimacy and accountability of nonstate actors. This research will also add to the scholarly debate about the economics and politics together and to a general discussion of the problem of FTAs versus democratisation.

The investigation has emphasized a link between democracy and economics, which has been highlighted by the argument that the data available stresses that states become democratic, once the economy grows to a certain level. The literature points towards democratisation, however for the most part it is unclear and nascent on the EU. The investigation will be able to test the existing literature and expand it, thus being able to find a causal link between FTAs and democratisation through the five simulations and the example of Armenia. The researcher hopes that the use of FTAs by the EU would be a continuation of the ENP and a more coherent way of producing stability.

Objectives and Originality

The main objectives of this study are set out here; they comprise three key aims that the investigation will promote. The objectives of the study are to: (1). create an analysis of the growing importance of FTAs for the newly democratic states in the ENP and their fledgling political structure, (2). expand the literature on democratisation and economics. With the possibility of FTAs promoting democracy, the literature between the two fields will thus be expanded, (3). demonstrate that FTAs provide an indirect, though further, link between the two topics.

As has been mentioned the research will enrich the current academic literature and will be innovative in a number of ways. It is the first study to the best of the researcher's knowledge that will investigate the link between the FTAs, the rule of law and democratisation. This is the foremost innovation of this study to expand the literature on this significant topic. The analysis will attempt to enlarge the literature between the literature on economics and democratisation, by locating a link between FTAs and democratisation. Besides it will promote greater thinking on the ENP strategy and its possible continuation, not to mention the promotion of the EU's role as an organization that is able to endorse itself through the use of soft-power. A further innovation of the study is to use five case studies to simulate the argument. By using states that have already signed FTAs with the EU and then monitoring variables before and after the signing of the FTA, it is hoped that a pattern will become apparent from an analysis of the statistics that points to the conclusion that FTAs do promote democratisation. These results can then be used to claim that there is a link between FTAs and democratisation which can be used to simulate, in this example, an FTA between the EU and Armenia.

Research Methods and Design

The research undertaken here will be qualitative and will mainly use three qualitative methods to analyse FTAs and their role in democratisation. The first research method is that of content analysis, where the study will use country reports of the EU to scrutinize how each of the five states were progressing, five years before the signing of the FTA and then up to five years after the accord. Although the study will use statistics it will not be running any statistical tests, but merely using the data to highlight whether an FTA helped promote democratisation within that state. Data will be taken from the five state examples on all potential variables pertaining to their economies over a five year time period. This will help to gauge any sudden numerical changes once the FTAs were signed. The economic data on Armenia will also be analysed using the variables for the five examples. The data accumulated from the five states after their individual FTAs will be used to simulate what potentially could occur if Armenia were to have an FTA with the EU. The data used in the study will largely be taken from the Country Reports of the EU, from the Transition Reports of the European Bank of Reconstruction and Development, Transparency International, Freedom House, Westminster Foundation for Democracy, World Bank, Worldwide Government Indicators and other reports.

The case study research method falls within the purview of the second qualitative research method. It is also used to describe an event that has a particular importance to the research question. There are two types of case study research method, the individual and multiple case studies. The investigation will be using the individual case study method, with the use of five examples to help present a clearer picture. It has been decided to use the individual case study method as it will provide a more lucid image and keep focus.

In order to understand the work one needs to briefly explain the third qualitative research method which is the concept of process analysis or process tracing, as it will be an important part of

understanding (if there is one) the correlations between FTAs and democratisation. To put it simply process analysis explains how something is or was done. It is a method for identifying and testing causal mechanisms. By emphasizing the causal process that leads to certain outcomes, process tracing provide the answer to the hypothesis.

The question of whether economic development leads to democracy will be examined from different theoretical paradigms, and the use and development of modernisation theory in current research will be discussed. It will be analysed whether high GDP per capita correlates with democracy. Empirical research will be used to show that economic development increases chances for a transition to democracy.

The research will utilize data from five case studies (Slovenia, Latvia, Albania, Montenegro and Macedonia) to highlight whether FTAs have a direct influence on economic liberalization and an indirect effect on political change. The five case studies investigated here are placed into three groups. Slovenia and Latvia have achieved EU membership status, Albania and Montenegro have FTAs with the EU (2000) and Macedonia is an aspiring member for EU association. It is felt that these five case studies will provide valuable insight into the different stages of a relationship with the EU. This will highlight the role of an FTA for democratisation in comparison to other measures that will be highlighted, for instance the ENP. Yet, the investigation must be clear that it is possible that an FTA is a weaker measuring tool for democratisation, or even has no link to it when compared with other variables. It is hoped that these five examples will emphasize a link between FTAs and democratisation.

The reasons that these states have been chosen is that like Armenia, they share a common history, as all were former-Communist states and all were part of larger federated entities. Albania, Macedonia, Montenegro and to a lesser extent Slovenia all witnessed violence during the early period of independence. Slovenia and Latvia provide a road map for Armenia showing that small and former-Communist states can become EU members, but in the near future it is Albania and Macedonia which will better emphasize to the Armenian Government and elites the necessity of closer ties with the EU through at least an FTA with the EU. The EU has FTAs with

Montenegro, Macedonia and Albania which were signed in 2000, however, the EU's relationship is more pronounced with Macedonia as it has progressed to the level of signing a Stabilization and Association Agreement (SAA) with the EU in 2004, something that Albania and Montenegro only ratified in 2009 and 2010 respectively. Macedonia helps to emphasize that even a small state ripped apart by a violent civil-war or insurgency can still progress 13 years on to be a the next possible EU member (Keukeleire and MacNaughton, 2008, p. 266).

To highlight the difference between this and other studies, the enquiry will use data obtained from the five examples to simulate how a potential FTA between the EU and Armenia would affect the Armenian economy and its political structure. This would be analysed through the use of variables, such as: Gross Domestic Product (GDP), GDP per capita, inflation rate, public debt. These would be the variables used to analyse whether the five case studies become economically

successful following their FTAs with the EU and the same variable would be used to calculate a simulation for an FTA between the EU and Armenia. Besides the pure economic variables, there will be other data used in this investigation which will emphasize the level of democracy, a potential decrease or increase in corruption and improved human rights. These data sources will be analysed after the signing of the FTAs to highlight whether democratisation has become entrenched within these states. If so this will corroborate the theory that FTAs have an indirect influence on democratisation. Using the variables mentioned earlier, it would be pertinent to monitor any potential change to the economic and political situation in the five case studies, once the states had signed an FTA with the EU. The variables will be of interest if they provide data that highlights minimal change in the five examples after they signed their individual FTAs with the EU. Or alternatively the data may emphasize that things remained stable after the states signed their separate FTAs with the EU, rather than show a marked change. These factors would show that an FTA was of little significance to a state's economic development and its potential democratisation. Regardless of whether FTAs have a link or not to democratisation, this investigation remains revolutionary purely for attempting to locate a link between the two and will be a huge contribution to both the field of economics and democratisation in its attempt to link both subjects together.

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Status quo of the Nagorno-Karabakh conflict

Anna Karapetyan

Introduction

The NK conflict between Armenia and Azerbaijan is the longest conflict in the OSCE area and a significant threat to peace and stability in the South Caucasus. In 1994 Azerbaijan and Armenia signed a ceasefire agreement, the parties entered to a state of frozen conflict, full-scale violence ended, but the political dispute remains unsolved. The parties failed to reach mutual beneficial agreement during 20 years of ceasefire. There is neither war nor peace. After 20 years peace negotiations are deadlocked. OSCE Minsk group tried to build peacekeeping mission programs but they don't have tangible results. Now all efforts to keep stable ceasefire have failed. The result of deadlocked peace processes increase ceasefire

violation and dozens of soldiers are killed on both sides. 2 NK is a de facto independent state, however it isn't recognized by any other

state. The status quo that exists since 1994 may destabilize regional security and risking a large confrontation in the South Caucasus. The main goal of this essay is to analyze the conflict and to find the real interests behind the positions of main actors and try to find measures for a win-win solution³ for the NK conflict.

The NK conflict between Armenia and Azerbaijan is the longest conflict in the OSCE area and a significant threat to peace and stability in the South Caucasus. In 1994 Azerbaijan and Armenia signed a ceasefire agreement, the parties entered to a state of frozen conflict, full-scale violence ended, but the political dispute remains unsolved. The parties failed to reach mutual beneficial agreement during 20 years of ceasefire. There is neither war nor peace.¹ After 20 years peace negotiations are deadlocked. OSCE Minsk group tried to build peacekeeping mission programs but they don't have tangible results. Now all efforts to keep stable ceasefire have failed. The result of deadlocked peace processes increase ceasefire

1 Abbasov, S. (2004), No closer prospects for the settlement of the Karabakh conflict, The Central Asia-Caucasus Analyst. (The central Asia-Caucasus Institute and Silk Road Studies program join center). <http://www.cacianalyst.org/publications/analytical-articles/item/8752-analytical-articles-caci-analyst-2004-2-11-art-8752.html>

2 Paul, A. (2010), Nagorno Karabakh; A ticking time bomb. (European Policy Center) http://www.epc.eu/documents/uploads/pub_1148_nagorno-karabakh.pdf

3 Kelman, C. K. (2009), 10 questions on Peace mediation, (Center for peace mediation, European University Viadrina, Humboldt-Viadrina school of governance), (Personal Communication by Martin Whaelsich, 04.04.2009)

violation and dozens of soldiers are killed on both sides.² NK is a de facto independent state, however it isn't recognized by any other state. The status quo that exists since 1994 may destabilize regional security and risking a large confrontation in the South Caucasus. The main goal of this essay is to analyze the conflict and to find the real interests behind the positions of main actors and try to find measures for a win-win solution³ for the NK conflict.

The origins of NK conflict began in ancient times. Both Armenians and Azerbaijanis believe that NK is a part of their country since at least 3000 years ago. However, the region has witnessed many changes of its population⁴ and the identity of political power. In 1923 the New Soviet Authorities awarded NK to Azerbaijan⁵ and created NK Autonomous Oblast within Azerbaijan.

The root of current conflict in NK dates back to 1988. In February 1988 Armenians held demonstrations in NK; the main goal was unifying NK with Armenia, because Armenians were subjected to discriminatory Azerbaijani police. On February 20 NK Autonomous Oblast demanded for the unification of NK with Armenia. As a response of that demonstration which Azerbaijan government perceived as a threat against territorial integrity, from February 28 to March 1 anti Armenian massacres occurred in Sumgait. The result of the attacks was 32 deaths and hundred injuries.⁶ In June USSR refused Armenians demand and Moscow placed NK under its direct rule, but Moscow was unable or unwilling to solve NK conflict. At the end of 1989 NK again was controlled by local authorities. In 1989 violence as a result of rail blockade by Azerbaijan intensified, leading periodic clashes between Armenians and Azerbaijani.⁷ In 1991 Azerbaijan Special Function Militia troops with Soviet Army troops conducted a passport regime⁸ called "Operation Rings". Many Armenians were deported and the Azerbaijani government claimed that this operation was necessary because Armenians moved illegally to NK to participate in the armed conflict.

4 Libaridian, Gerard,(1994), Azerbaijan, Seven years conflict, (Human Rights Watch/Helsinki, New York) p.8, Nevertheless, according to the 1989 census NK's population was 145.000 ethnic Armenians and 45.688 ethnic Azerbaijanis.

5 The decision made by Joseph Stalin during the Sovietization of Transcaucasia

6 Bloodshed in the Caucasus, Escalation of the Armed Conflict in Nagorno Karabakh(1992). (Human Rights Watch/Helsinki, New York) p. 5.

7 Panosyan, R.(2002), The Irony of Nagorno Karabakh, in: Hughes, J./ Sasse G.(eds.) Ethnicity and Territory in the former Soviet Union. Regions in Conflict. (London) p.145.

As a result of mutual ethnic cleansing 400000 Armenians fled from Azerbaijan, and 160000 Azerbaijanis from Armenia.⁹ As a response of Operation Rings and

the collapse of the Soviet Union, NK Autonomous Soviet claimed the establishment of the NK Republic. Azerbaijan didn't accept the announcement; then occurred a referendum and a majority of residents voted for independence from Azerbaijan. In 1992 NK parliament declared independence from Azerbaijan and a full-scale war erupted between Azerbaijan and Armenia. In total, Azerbaijan lost 15 percent of its territory.¹⁰ After four UN resolutions¹¹ and OSCE Minsk group talks Azerbaijan and Armenia signed a ceasefire in May 1994.

Positions and interests of the main actors in the

NK conflict

There is no significant development in the peace process because of own interests of external and internal actors. NK has a great historical value both for Armenians and Azerbaijanis. Armenia considers that it isn't a party to the conflict and Azerbaijan should negotiate directly with NK. The relationship between Armenia and NK is very close since NK economically depends on Armenia.¹² The Armenians' position on the NK conflict is clear: Their demands are based on the self-determination of peoples. Azerbaijan should recognize NK as an independent state; Azerbaijan should open the border. However, Armenia has its own interests, Armenia being blockaded by Azerbaijan and Turkey facing significant security and economic issues. Solving the NK conflict would help Armenians to break out of their isolation, and improve the social and political situation. Armenia tries to be part of a regional energy project and to be a link between Central Asia and Europe. Armenia has lost rail and pipeline transit opportunities between Turkey and the Caspian region.¹³ The resolution of NK conflict will contribute to reduce the economic and political influence of Iran and Russia.

⁸ In former Soviet Union everybody had internal passport, which include residence permit, if citizens want to move another town they had to get a propiska(registration) for the new place.

⁹Bremmer, I./ Taras, R.(eds.)(1997), *New State, New Politics, Building the Post-Soviet Nations*, Cambridge (University Press, New York) p. 488.

¹⁰ Panosyan, R.(2002), *The Irony of Nagosrno Karabakh*, in: Hughes, J./ Sasse G.(eds.) *Ethnicity and Territory in the former Soviet Union. Regions in Conflict*. (London)p.148.

¹¹ UN Security Council resolutions 822, 853,874 and 884, adopted in 1993 offensive of the Armenian-Karabakh forces and urging the withdrawal of troops from the territory of NK.

Security also has a palpable importance for both countries; each side perceives the other as a threat to its security. Karabach Armenians declared that the referendum which they held in 1991 fully justifies their declaration of independence. The government of NK claims that the population has the right of self-determination. Government demands recognition of the republic of NK by the Azerbaijani government. Armenia tries to give the maximum legitimacy to Karabakh, call themselves third parties, but Azerbaijan refuses to negotiate with them. 14 Their interests are mainly connected with security concerns. They try to be independent from Azerbaijan, and the main further goal is unification with Armenia. NK has no economic potential, natural resources. The only way to go out from NK is through Armenia and NK could not survive without Yerevan.

The Azerbaijani government claims NK their historical territory and believes their territorial integrity violated. They refuse to negotiate with officials of the self-proclaimed “Republic of NK”; their negotiation partner is Armenia. They demand the withdrawal of Armenian forces from occupied Azerbaijan territory, the resettlement of Azeri IDPs and they would guarantee the security of NK Armenians. 15 Azerbaijan's interests also face economic and security issues. Azerbaijan has successful gas and oil resources, which may be indispensable in the future in European energy security. 16 Azerbaijan avoids solving NK conflict by force because it'll cause great harm to its economy, especially to the Baku- Tbilisi-Cehyan oil pipeline. 17 The further plans related to South Caucasus gas pipeline for access to Europe would be transported by Baku-Tbilisi-Erzurum gas pipeline. 18

Azerbaijan's interests related to the land corridor for accessing Nakhichevan. 19 If they would solve NK conflict, they may have opportunity to receive a land corridor across Armenia to Nakhichevan. It'll be a link between Central Asia and Europe and will contribute to transport their gas, oil pipeline to Europe.

¹² Libaridian, Gerard, (1994), Azerbaijan, Seven years conflict, (Human Rights Watch/Helsinki, New York) p.111.

Note: Some estimate that 7 to 9 percent of Armenian's budget goes to NK.

¹³ Regional trade will be greater and cost of transportation lower if links reopen between Armenia and Azerbaijan.

¹⁴ Waal, T. (2011), South Caucasus, 20 year of independence; The conflict of Sisypus, the elusive search for resolution of NK dispute. (Berlin, Friedrich-Ebert-Stiftung) p.144

Russia has close relationship with Armenia: being the co-chair of the Minsk Group, it has managed the negotiation process for the NK conflict. Russia's position is ambiguous; sometimes it seems to act as a secondary party within Armenia, and in some situations it is a third party willing to solve the conflict peacefully.²⁰ Russia has almost full control over all spheres in Armenia²¹ and Armenia is a strategic and economic foothold in the Caucasus, that's why Russia tries to preserve the status quo to keep its military presence in the region. Russia has also control over the oil pipelines. It also has economic interests, related to Caspian resources which may be transported to Europe through Russia.²² Russia is one of the main countries for Azerbaijan for buying weapons. ²³ So, any confrontations or changes in the region would be very harmful for Russia's security and economic interests. Russia would rather not see the NK conflict resolved, because their influence would be diminished in the Caucasus if Armenia becomes more independent from Russia.

The US is also involved in the NK conflict as a co-chair of the Minsk group. The South Caucasus is a geopolitical game in the hand of world power centers (US, Russia). The NK conflict has been balancing diplomatic relationship between Russia and the US. The US's interests come from a geostrategic tension between Russia

15 Libaridian, Gerard,(1994), Azerbaijan, Seven years conflict, (Human Rights Watch/Helsinki, New York) p 177.

16Total's discovery boosts Azerbaijan's gas reserves (2011), (Reuters, Africa)

0.64 % of proven world gas reserves of 2012 and 0.47% of proven world oil reserves as of 2010
<http://af.reuters.com/article/energyOilNews/idAFL5E7KC2F320110912>

17Note:Baku-Tibilisi-Cheyanpipeline is in distance of only 15 kilometers to the northern border of NK.

18 Meister, S./Vietor, M. (2011), South Caucasus, 20 year of independence; Southern gas corridor and South Caucasus. (Berlin, Friedrich-Ebert-Stiftung) p. 339

19Nakhichevan, the isolated province of Azerbaijan, sequezzed between Armenia, Iran and Turkey. It is separated from the rest of Azerbaijan, and it has been almost cut off from the outside world.

20 Baser, B. (2008) Third party mediation in NK: Part of the cure or part of disease, Journal of Central Asian and Caucasian Studies (JCACS), 3 (5)p 97

21 Note: Russia has full control economic, military and political spheres in Armenia. Russia is military alliance of Armenia, all Armenian strategic sectors are under control of Russia(railway, telecommunication, gas supply, energy sectors).

22 Nuriyev E. (2001), Geopolitical Breakthrough and emerging challenges: The case of South Caucasus, Journal of International affairs, 4(2)

23 Russia has begun delivering tanks, artillery cannons and rocket launchers worth \$1 billion to Azerbaijan,(2013).(Reuters) <http://www.reuters.com/article/2013/06/18/us-russia-azerbaijan-arms-idUSBRE95H0KM20130618>
<http://www.bloomberg.com/news/2013-08-13/azeri-russian-arms->

Millennium Development Goals In Nigeria; Issues And Prospects: An Historical Paradox

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ABSTRACT

The paper seeks to explore the recognition of importance of education to the development of a nation, as a means of poverty eradication which is regarded as the most important goal of human development. Ironically, in the time past in Nigeria, education delivery has suffered major setbacks ranging from inadequate frameworks policy, project duplication, gross inefficiency and corruption. In view of this and many others, the United Nations, comprising of Nigeria and other 188 members, in year 2000, in a meeting widely referred to as Millennium Summit in the United States of America, came up with the idea of Millennium Development Goals (MDGs) especially for developing countries, for the purpose of poverty eradication, hunger reduction and education promotion for all (Mohammed, (2006). It is a shocking paradox that a significant proportion of Nigeria population is poor despite its enormous wealth as Adejuwon and Tijani (2012) argued. Therefore, this paper, through historical exploration, examines those issues that arose since the commencement of MDGs as it concerns Nigeria as well as prospects of achieving a remarkable impact within timeframe. The paper concludes that governments at all levels need to be sincere in the implementation of MDGs if the of illiteracy, poverty and hunger are to be eradicated by year 2015 as the year set out to achieve goals of the Millennium Development.

Key Words: Education, Human Development, Millennium Development Goals, Poverty

Introduction

The aim of the Millennium Development Goals (MDGs) is to bring about a world where hunger, bad leadership, corruption and all other forms of social vices are eliminated (Akpotor, 2009). Apart from providing concrete and numerical benchmarks for tackling extreme poverty in its many dimensions, MDGs is also to provide a world where all the essential needs of man are provided. As Mohammed (2006) noted; the ratification of the MDGs by the United Nations Millennium Summit in September 2000 in New York by 189 Heads of States and Governments, became effectively the world's most vital development challenges, offering the international communities, the chances to have a joint position and integrated vision on the best ways to address and equally solve multidimensional problems facing mankind and to

promote sustainable development, especially for developing and less developed countries.

The initial MDGs objectives amongst others include; reduction of child mortality by two thirds, reversal of the spread of HIV/AIDS, malaria and other diseases, a 50% reduction in poverty and hunger, promotion of gender equality, establishment of universal primary education. In September 2005, United Nations Summit met and reviewed the progress towards the goals and set the development agenda for the next decade. In light of this, the Declaration's eight MDGs are to address the issues below:

- Poverty and hunger eradication that by 2015; there should be an increase in the amount of food for those who suffer from hunger;
- Reduction of two-third child mortality by 2015;
- Improvement of maternal health and reduction by three-fourth the proportion of women dying in childbirth by 2015;
- Achievement of Universal Primary (Basic) Education by 2015;
- Ensuring environmental sustainability to reduce by half the proportion of people without access to clean drinking water as well as basic sanitation;
- Promotion of gender equality and women empowerment in order to overcome gender disparities in both Primary and Secondary education enrolment and achieve equity at all levels by 2015;
- Global partnership development to recognize the importance of the collaboration between the 'haves' and 'have-nots' in order to eradicate poverty and extreme hunger; and
- Combating of HIV/ AIDS, malaria and other diseases by 2015.

Therefore, following the Millennium Declaration in year 2000, Nigeria commenced the systematic implementation of several policies and programmes to help her attain different targets set for the MDGs by year 2015, Unfortunately, the current progress towards the attainment of these goals is approximately at a 'snail's pace' (Amaghionyeodiwe and Adediran, 2012).

Historical Background Of The Mdgs In Nigeria

The battle against poverty has been a central plank of development planning since independence in Nigeria. About fifteen ministries, fourteen specialised agencies and nineteen donor agencies as well as various non-governmental organisations have been involved decades in this crusade, yet about 70% of Nigerians still live in poverty (Oshewolo, 2011) despite the fact that Nigeria is endowed with abundance of human and natural resources. It has substantial oil wealth, yet she ranked amongst the world's poorest nations, simply because of lack of sufficient resources necessary to maintain a minimally adequate standard of living (Omadjohwoefe, 2011). Poverty is multidimensional, and extends from low level of income and consumption to poor health and lack of education to other 'non-material' dimensions of well-being.

Against this backdrop, World Bank (2010) defines poverty as a condition of life degraded by diseases, deprivation and squalor. Nwaobi (2003) asserts that Nigeria presents a paradox in the context of poverty situation. Thus, failure of combating this endemic problem of poverty has been largely apportioned on corruption, infrastructural decay, poor governance and government accountability (Okonjo Iweala, Soludo and Muhtar, 2003). In addition, Gore (2002) explains the concept of 'all-pervasive' poverty where the majority of the population lives below income levels which are quite insufficient to meet their basic needs.

As argued by Ovwasa (2000), it is evidently clear that Nigeria is a poor nation hosting the third largest number of poor people after China and India despite being the sixth largest exporter of oil. Along this line, in the survey of poverty profile; it has been established that about 50% of Nigeria's rural population that accounts for about 70% of the total population lives in poverty and that more than 50% of this mentioned poverty is among women (Onimode, 1996 and Odion, 2009). Given this persistent poverty problem, Kakwani and Pernia (2000) submits that various governments in Nigeria have tried to implement some poverty reducing policies and programmes aimed at improving welfare of human being.

Before government efforts were backed up by the adoption of MDGs in order to alleviate and promote sustainable development by the year 2015 as expressed by (Eze, 2009), different interventionist programme have been established by successive governments in Nigeria which have been categorized into two distinct timeframes or eras reference to literature on development, notably, the Pre-Structural Adjustment Programme (Pre-SAP), Structural Adjustment Programme/Post –Structural Adjustment Programme (SAP) eras (Oshewolo, 2011). The policies of the Pre-SAP and SAP eras obviously failed to eradicate poverty in Nigeria as argued by Oshewolo because poverty situation in Nigeria was on steady increase, attributed to lack of targeting mechanisms for the poor.

Historically, President Obasanjo Olusegun's regime in the fourth republic in 1999 launched the Poverty Alleviation Programme (PAP) in order to bail the poor out of doldrums of poverty by creating 200,000 direct jobs to unemployed youths (Obadan, 2001). Thereafter, was again the introduction of National Poverty Eradication Programme (NAPEP) in year 2001 following the ineffectiveness of Poverty Alleviation Programme (Omotola, 2008), and NAPEP has been structured to integrate four other sectoral schemes which include, Youth Empowerment Scheme (YES), Rural Infrastructural Development Scheme (RIDS), Social Welfare Service Scheme (SOWESS), and National Resources Development and Conservation Scheme (NRDCS). It is instructive to note that in year 2004, formation of the National Economic Empowerment and Development Strategy (NEEDS) which was described as a medium term strategy was equally duplicated by all the 36 states of the federation under the rubric of State Economic Empowerment Programme Scheme (SEEPS) simply to give encouragement to Nigerians in order to contribute and be actively

involved in all aspects of development so as to eradicate poverty (Adejuwon and Tijani, 2012).

Similarly, the administration of late President Umar Musa Yar'adua which began in year 2007 had seven point agenda of development which invariably turned out to be the policy thrust of his administration. Principally amongst others in the agenda was to improve the well-being of Nigerians as a whole, in addition, to make the country become one of the biggest economies in the world by the year 2020. Further afield, his agenda was to address the issue of transportation, power, telecommunication, food, security, as well as national gas distribution. Significantly, poverty alleviation and wealth creation was the seventh key area of his administration. Though his programmes seemed laudable, but they did not give room for effective implementation and proper monitoring as Oshewolo (2010) pointed out.

Issues On Mdgs In Nigeria

To a very large extent, all the various poverty alleviation initiatives in Nigeria since independence have yielded very little positive result. Ranging from Operation Feed the Nation (OFN), Free and Compulsory Primary Education (FCPE), Green Revolution, Agricultural Development Project (ADP), Low Cost Housing, Rural Electrification Scheme (RES), National Agricultural Land Development Authority (NALDA), River Basin Development Authority (RBDA), Agricultural Credit Guarantee Scheme (ACGS), Rural Banking Programme (RBP), Strategic Grains Reserves Programme (SGRP), Directorate for Food, Roads and Rural Infrastructure (DFFRI), National Directorate of Employment (NDE), Better Life for Rural Women Programme (BLRWP), People's Bank of Nigeria (PBN), Community Bank Programme (CBP), Family Support Programme (FSP), and Family Economic Advancement Programme (FEAP) (Garba, 2006 and Eze, 2009).

It is noteworthy that despite these anti-poverty measures, poverty has been on the increase in Nigeria, which really depicts the ineffectiveness of the strategies and programmes. Notable issue is the problem of management and governance, joined with lack of accountability and transparency; as well as lack of mechanisms for the sustainability of most programmes (Obadan, 2001). Another worrisome issue against the realization of MDGs within time frame in Nigeria is the issue of poor leadership and insincerity in governance, policy inconsistency as well as lack of adequate data base (Anger, 2010). In view of this, accurate and timely statistical figures including a gender disaggregated data must be put in place for effective economic development to take place.

It is on record that many workers were laid off in Nigeria as a result of the rationalization exercise adopted during the Structural Adjustment Programme years. Not only this, SAP which was introduced during the tenure of General Ibrahim Babangida in 1986 worsened the incidence of poverty in the country. SAP initially

was designed to last for two years from July 1986 to January 1988 with the sole aim of reviving the economy and put it on a path of sustainable development growth. However, a decade after, as argued by Aliyu (2010), poverty incidence in Nigeria was estimated to be about 66% in a total population of about 110 million. The situation of Nigerian workers especially in wage administration necessitated most of the corrupt practices in the country's public service. Majority of the Nigerian workers lives in penury due to insufficient income to cover minimum standards of food, shelter, water, medical care amongst others.

Significantly, Igbuzor (2006) opined that Nigeria is among 20 countries in the world with widest gap between the rich and the poor. The total income earned by the richest 20% of the population is 55.7% while the total income earned by the poorest 20% is 44% (Earth Trends, 2013). Along this line also, Oshewolo (2010) submits that life expectancy at birth in Nigeria in 2006 for male and female stood at 46 and 47 years respectively. He added further that, between the year 2000 and 2007, 27.2% of children under five were malnourished, a situation described as a 'bewildering paradox' when compared to the figures of 3.7% between the same periods in Brazil, another emerging economy.

Another issue worthy of attention is the issue of Foreign Direct Investment (FDI) inflow into Nigeria which is quite low. AFRODAD (2005) as espoused by Oshewolo (2011) reveals that between year 2000 and 2003, the ratio of FDI to GDP averaged a mere 2.3%; these inflows into Nigeria are rather low in comparism with high inflows into Asian countries. Therefore, Nigeria is far behind the minimum investment rate of about 30% of GDP required to reach a growth of 7.8% per annum and achieve the MDGs by 2015. To all intents and purposes, Nigerian economy remains largely undiversified, more so that the oil sector, which attracts most of FDI, generates nearly 95% of total export earnings and obviously constitutes the mainstay of economy in Nigeria. Therefore, in order for poverty to be eradicated, it requires transformation of the economy towards the path of sustainable industrialization anchoring on jobs creation and social inequality eradication.

Simply put, over the years, there seems to have been a deliberate and continuing curtailment of public expenditure on social services especially on education and health. It is on record that UNESCO has set the benchmark for those developing countries (Nigeria inclusive) to allocate 25% of their national budget on education, whereas, Nigeria's budgets allocate between 10% and 12% only. In the health sector, in the last decade, less than 10% was allocated, whereas World Health Organisation (WHO) recommended that 15% of national budget be allocated. More worrisome is the fact that, the actual amount released from the budget has been far less than the allocation even hampered by endemic corruption. Most often, political office holders diverts public funds meant for development into their private pocket, making them to become rich.

Another notable issue hampering Nigeria's aspiration of achieving MDGs by 2015 centered on poor nature of governance in Nigeria; which invariably affected the culture of the inter sectorial partnership. It must be averred that, state dominance in development activities does not automatically sum up to good governance. Previous policies on poverty reduction in the country have been dominantly designed and implemented by the state. Where inputs from other sectors were allowed, such were not properly coordinated for effective impacts on the poor population (Oshewolo, 2010). Be that as it may, far apart from the daunting issues of poverty alleviation, suffice to mention that, there are prospects of achieving the MDGs in Nigeria.

Prospects Of Mdgs In Nigeria

Following the escalating nature of poverty in Nigeria, poverty alleviation initiative should be, on the first hand, well articulated and made to be a short term, targeted at the poor basically. Amaghionyeodiwe and Adediran (2012) contend that, if poverty alleviation programme is re-structured and re-designed and made to be centered on the 'basic needs' approach, it would, on the other hand, bring about a permanent reduction of poverty. Improvement in education, health and nutrition directly address the consequences of being poor, thus, investing in human capital, especially in education, shelter and social services increases the productivity of the poor and at the same time, attacks some of the most important aspects of poverty.

Furthermore, all various levels of government must make reaching the poor a priority. When the Federal Government relinquishes most of its responsibility in the social sector to the state and local governments, they would be autonomous to evolve poverty alleviation programmes/ projects that will meet all needs of the populace. In addition, collaboration between the private sector, civil society and even the donor community will promote better harmonization and implementation of pro-poor policies. Significantly, participation and involvement of the relevant stakeholders will promote collective ownership of the development plan as against previous practices and strategies dominated largely by the state.

Similarly, activities of the various anti-corruption agencies such as Independent Corrupt Practices and other Related Offences Commission (ICPC), the Economic and Financial Crimes Commission (EFCC), the Code of Conduct Bureau and Due Process Office need to be more strengthened in order to tackle and address effectively the culture of corruption in the official and public sector. Values orientation among the populace needs not be jettisoned. States need to intensify effort in producing goods locally through the application of indigenous technology and industrial impact; by so doing enormous employment opportunities would be generated to alleviate poverty. It is of good note to allow periodic and consistent reporting of the MDGs in the country for the promotion of accountability and transparency (Odion, 2009). By and large, there is urgent need for government to initiate long term strategic plans that will address unemployment, taking into consideration the educational curriculum and the

needs of the labour market in addition to strengthening the human and financial capacity of poverty alleviation institutions in the country.

Conclusion

Following the trend of discourse, it should be noted in this study that, since independence, successive governments in the country had put in place diverse policies of addressing the scourge of poverty in Nigeria. Undoubtedly, these policies did not yield such expected results due to lack of required political will as well as concerted effort. Invariably, this affects Nigeria's steady progress in MDGs achievement. The Nigerian situation and current happenings indicates that there are still glaring constraints of infrastructural inadequacies, corruption, and high rate of unemployment amongst others. Just of recent, about 20 Nigerians died due to stampede during the recruitment exercise into the Nigerian Immigration Service. More than 500,000 applied for advertised job or vacancies of only 2,500. Invariably, this ugly incident depicts high rate of unemployment in the country. Therefore, government must create enabling environment for private sector to contribute to poverty reduction with strong contributions to employment as well as higher incomes, most especially for those involved in agricultural production and trade. Also, the private sector can contribute to the development of infrastructure and the efficient social services delivery, to eradicate illiteracy on education, health, water and energy.

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Terrorism as a Strategic Communication Phenomenon

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ABSTRACT

At present, terrorism is still an ambiguous concept. The multiplicity of types and causes of terrorism is often concealed by the factual similarity of terroristic acts in their consequences. In addition, as 'terrorism' continues to reinvent itself, its ever-changing nature persists in puzzling academics around the world. Nevertheless, there are some common themes which have outlined the directions for terrorism research over the last decades. Most of them are applicable to particular aspects of the phenomenon rather than its holistic structure due to limitations, partly described above. In an attempt to present 'terrorism' as fully as possible, the present work focuses on its specifics as a communication approach.

Through a detailed analysis of theoretical work and a comparative analysis of case study materials, the article demonstrates significant benefits in perceiving terrorism as a strategic communication concept. The positives of placing the phenomenon within this framework include, but are not limited to, the opportunity to examine the role of different actors, define their positions and aspirations, and account for both the rational and emotional aspects of their behavior. Using a classical set of tools for analyzing a communication process, the research provides a new approach towards understanding and countering terrorists' activity in the future.

Key words: terrorism, strategic communication, Munich 1972, September 11, counter-terrorism, comparative analysis;

Introduction

The concept of 'terror' and particularly 'ruling through terror' has been a part of the human civilization throughout history. Initially, it was associated with religion and the 'divine right' of the sovereign to take life. Much later, during the French revolution, its meaning shifted and it was conceptualized as a tactic employed by the enemies of society, a connotation closer to the one it has today. At present, terrorism is still an ambiguous concept. The multiplicity of types and causes of terrorism is often concealed by the factual similarity of terroristic acts in their consequences (Schmid & de Graaf, 1982). In addition, as 'terrorism' continues to reinvent itself, its ever-changing nature persists in puzzling academics around the world. As Spencer has stated: 'if people know anything about the field of Terrorism Studies it is most probably that it has failed to find a definition of its own subject' (2010, p. 1).

Nevertheless, there are some common themes which have outlined the directions for terrorism research over the last decades. Some of them more successfully than others. Most of them applicable to particular aspects of the phenomenon rather than its holistic structure due to limitations, partly described above. In an attempt to present 'terrorism' as fully as possible, the present work will focus on its specifics as a communication approach and through a detailed analysis of theory and practical examples will prove that it is indeed a strategic concept. The positives of placing the phenomenon within the framework of communication include but are not limited to the opportunity to examine the role of different actors, define their positions and aspirations, and account for both the rational and emotional aspects of their behavior.

It is not the purpose of this article to condemn or encourage the use of terrorism as a communication form. The term 'terrorism' itself, as stated by some scholars (e.g. English, 2010), has a strong pejorative connotation in our modern society and is rarely used to describe one's own actions. The intention of the present work is to simply provide another perspective to the already wide range of terrorism research whilst acknowledging the efforts of other academics to look at the investigated phenomenon through the prism of 'communication' even if differing from the one presented here.

Violence as Communication

Crelinsten is one of the most prominent scholars arguing in favor of the idea that violence can be conceived as a form of communication. He also acknowledges the fact that it can sometimes be used in concert with other forms of communication and sometimes in their stead (2002). If we assume this notion to be true, then there is a pending question which needs to be answered. Does 'terrorism' fall in the broader category of violence mentioned above or do its specifics separate it as the exception which proves the rule?

If we had a single definition of the term, it might have been easier to find an answer. Nevertheless, we shall try and explore the definitions of the phenomenon provided by different scholars over the years and compare them with the idea of strategic communication. The essence of communication is the exchange of information and/or expression of ideas, thoughts, feelings etc. to a second party (Burleson, 2010). In this regard, nearly all existing definitions of terrorism would suggest at least two active sides in an exchange (terrorists and victims). Thus, terrorism is indeed a communication form but can we classify it as a form of strategic communication?

Communication is strategic when there is a short or long-term goal involved and it dictates the way it is carried out by at least one of the participating parties (Hristov, 2008). Looking closely at the definitions of 'terrorism' we can outline that it is 'intended to influence' (US State Department cited in English, 2010, p. 2), 'intimidate or coerce' (FBI cited in English, 2010, p. 3), 'achieve political objectives' (US Department of Defense cited in English, 2010, p. 3), 'attain political goals' (Kydd & Walter, 2006, p. 52), 'intimidate or frighten' (Pape, 2006, p. 9), 'to have far-reaching

psychological repercussions'(Hoffman , 1998, pp. 43-44), 'to manipulate'(Schmid & Jongman, 2005, p. 17)and also – 'to communicate a message'(Gearty, 1992, p. 1).All of these definitions are clearly stating that there is an agenda on behalf of the terrorists which they try to fulfill in the process of the act itself or in its aftermath and this agenda can range from communicating a message to intimidating and coercing. It can be argued that terrorism can indeed be perceived as a form of strategic communication which has its own specific goals and methods to pursue them.

However, in order to examine the phenomenon as an act of communication, we need to establish the elements involved in such. The original communication model was developed by Shannon and Weaver(1949)but for the purposes of the present work it would not be suitable as it does not include a 'message' which is an essential component of every terrorist activity.Without a message, there can be no political aspirations and subsequently – the instances of violence are simply a crime(Richardson, 2007). Thus, we will turn to the models of Berlo(1960)who introduced the 'message' element in his model of communication and Wilbur Schramm(1954)– indicating that we should also examine the impact that a message has (desired and undesired) on the target of the message. On the basis of this theoretical framework, we can establish that the key elements in a communication process are:

- Sender – encodes the message in such a way as to suit the planned strategic objectives.
- Channel – the means through which the message is conveyed to the Recipient.
- Message – the actual information, notion, sentiment which is to be expressed.
- Recipient – decodes the message, not necessarily in its full and original form.
- Feedback – actions taken by the Recipient to indicate their understanding of the message and subsequent behavior.

A more visual representation of the model we will use can be found in fig. 1 below:

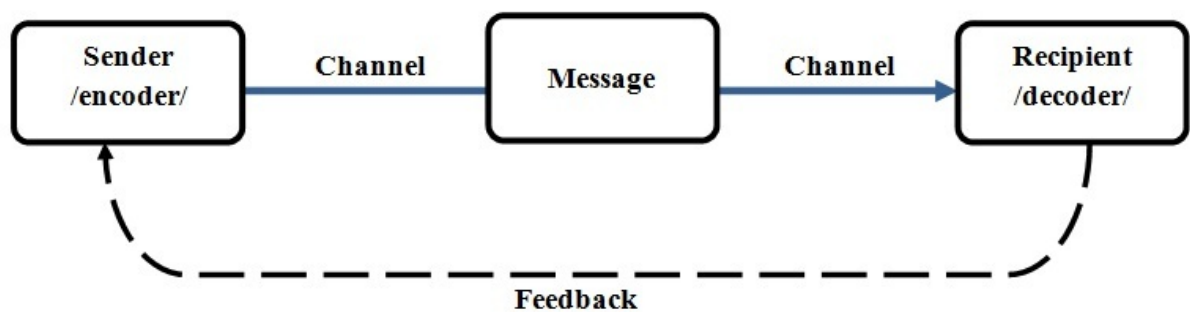


Figure 1 - Pavlova, G. (2013) Is there a difference between public diplomacy and propaganda? Unpublished

Having this model as a base would greatly benefit our exploration of terrorism as a communication strategy. But before we proceed with a detailed investigation of its separate elements, it is essential to use a particular case-study to supplement the presented theoretical framework.

When we consider the terms ‘terrorism’ and ‘communication’, the first events which would come up are probably the 9/11 attacks launched by al-Qaeda upon the United States. And even though there is a reasonable argument behind undertaking the challenge and examining them in detail, as many scholars have done over the course of the last decade, the event is still a part of the relatively recent history and its implications and specifics have not yet been defined. This is why we should focus our attention towards what Hoffman considers to be the beginning of ‘the modern-era of international terrorism’ (1998, p. 56). Schmid and de Graaf proclaimed in the 1980s that ‘there can be little doubt that the most effective recent non-state terrorist users of the media have been the Palestinian fedayeen’ (1982, p. 27). And they were probably right as the Palestinians outlined the course for development of many terrorist organizations for decades afterwards, including the infamous al-Qaeda.

As a result, our primary case study to which we will apply the above-described communication model as an analysis tool will be the terrorist attack in Munich 1972. However, in order to extend the practical relevance of the present paper, newer examples of terrorist activity will be used as a comparative point. This will serve to indicate the model’s applicability to newer instances of terror. The chosen cases have mostly illustrative character. Rather than aiming at a representative sample and quantitative analysis of terrorism, the current work is a part of an on-going research in the field and further contributions would be more than welcomed.

Background

After the loss of the Six Day War in 1967, the Palestinians focused towards winning the ‘hearts and minds’ of the world and for them, terrorism served primarily as ‘an instrument of mass communication’ (Schmid and de Graaf, 1982, p. 27). Two of the most successful terrorist operations in terms of media coverage are carried out by Palestinians. The first is the hijacking of an Israeli El Al commercial flight on 22nd July 1968. It changed the terrorism paradigm in two important ways, namely: it was the first time when terrorists travelled from country to country to plan and organize attacks; they targeted ‘innocent civilians’ from countries that had little to do with the political grievances related to their cause.

These were largely facilitated by the technological advancement and the beginning of globalization. Modern technological developments have provided a ‘determined minority with new sources of strength and with a sense of power’ (Ivianski, 1977, p. 54). The notion has carried on through the decades and through different terrorist organisations up to modern instances such as ISIS and their use of Twitter to recruit women. Nevertheless, it was the Palestinian fedayeen who reshaped the understandings of terrorism and made a crucial step in its development.

The event which managed to draw the most attention to the Palestinian cause, occurred on 5th September 1972 when the PLO’s Black September Organization attacked in Munich during the Olympic Games. They took the Israeli Olympic team as hostages and offered to exchange them for 236 Palestinians being held in Israeli jails, along with 5 other terrorists being held in Germany. The rescue plan went horribly wrong and resulted in the deaths of 11 Israeli Olympic athletes and 1 West German policeman.

The notion of such an extreme form of violence during the Olympic Games is just as terrifying today as it was in 1972. The world was shocked as the attack was completely unexpected. It is easily shown in the fact that Jim McKay¹³² – a sports journalist, had to cover the events for the American television ABC. He was on the air for fourteen hours without a break (Hiestand, 2008) and as the tragedy came to an end he proclaimed from the screen:

When I was a kid, my father used to say: ‘Our greatest hopes and our worst fears are seldom realized’. Our worst fears have been realized tonight. They have now said there were 11 hostages; two were killed in their rooms yesterday morning, nine were killed at the airport tonight. They’re all gone. (Jim McKay cited in Hiestand, 2008)

And this phrase, along with the image of a man, standing on a balcony with a mask on his head, became the headlines of media across the world. As horrific as it might seem, undertaking such a radical terrorist action during the Olympic Games was a

¹³²James Kenneth McManus a.k.a. Jim McKay (1921 – 2008) – American television sports journalist.

perfectly rational idea from a communication standpoint and it proved itself beneficial. 'Eight Black September terrorists captured the attention of an estimated 800 million spectators' (Commer, 1972, p. 13). Even though they demanded exchange, it wasn't the material purpose of the operation which was leading them in action, but the psychological effect. They wanted to convey a message to as many people as they could. Abu Ijad, Chief of Intelligence for the PLO and also a co-founder of El Fatah has indicated 3 distinct goals or aims of the action:

1. Strengthening of the existence of the Palestinian people.
2. Echo with the international press assembled there.
3. Liberation of fedayeen imprisoned in Israel. (cited in Schmid and de Graaf, 1982, p. 30)

The first two goals are obviously closely related. Just a few years before that, the Palestinian issue was mostly neglected throughout the Western world. For twenty years, the world had 'hardly taken any notice of the fate of the two and a half million displaced Palestinian Arabs' (Schmid and de Graaf, 1982, p. 27). Placing the physical goal last, Ijad prioritizes the communication aspects of the action and hints that at that point in time, attracting attention to the grievance of the Palestinian people was the primary task. And they did manage to fulfill it as media representatives from around the globe were in Munich to report the Games.

Another terrorist attack of similar magnitude and with its own cornerstone position in modern history is the one which took place on 11th September 2001. It was again a direct effect of globalization and advancements in technology which made it possible. 2 996 people died as a result of the 4 coordinated terrorist attacks by al-Qaeda. Investigators pointed towards Osama bin Laden, then the leader of the group and his declaration of a holy war against the United States in a fatwa¹³³ issued in 1998. A little over a year after the attacks, bin Laden himself declared the following motives:

1. U.S. support of Israel;
2. Support for the "attacks against Muslims" in Somalia;
3. Support of Russian "atrocities against Muslims" in Chechnya;
4. Pro-American governments in the Middle East (who "act as your agents") being against Muslim interests;
5. Support of Indian "oppression against Muslims" in Kashmir;
6. The presence of U.S. troops in Saudi Arabia;
7. The sanctions against Iraq (bin Laden, 2002).

On the outlook, seven different motives seem a bit too much for a single act of terrorism, even if it is of the magnitude of 9/11. However, a closer look would present

¹³³ 'Fatwa' in the Islamic faith is the term for the legal opinion or learned interpretation that the Sheikhul Islam, a qualified jurist or mufti, can give on issues pertaining to the Islamic law (Hallaq, 2004).

us with a much clearer picture. As some scholars have noted, bin Laden hoped that the move would provoke the US to enter a military campaign which would unite 'the faithful' against the West and start a wave of revolutions across the Arab world (Doran, 2005, pp. 72–75). The view does not lack evidence to support it. There is little in common between the problems in Israel, Somalia, Chechnya and Kashmir besides the fact that all these conflicts involve a portion of the Muslim population. Therefore, "increasing the military and cultural presence of the US" in the Middle East might force people from the region to respond violently and even form conservative Islamic governments or ruling systems as is the case with ISIS (Bergen, 2006, p. 229). All the mentioned reasons can be summed under one common umbrella – defending the Muslim population around the world. Subsequently, the 9/11 attacks can be perceived as an attempt to support pan-Islamism as a form of religious nationalism, distinguishing itself from similar pan-nationalistic ideologies like pan-Arabism by excluding culture and ethnicity in their role of unifying factors.

It is obvious that both the Palestinians and al-Qaeda recognized and utilized an opportunity in a very radical way. And even though both did some initial damage to the righteousness of their respective causes, strategically – they managed to achieve some of the objectives.

In the case of the Palestinians, millions of people in around 100 countries became aware of the Palestinian issue and the world was forced to take notice. It is not entirely coincidental that less than 18 months after the incident in Munich, the PLO leader, Yasser Arafat was invited to address the UN General Assembly. Shortly afterwards the PLO was granted special observer status at the UN and by 1980, it (a non-state actor) had formal diplomatic relations with more countries (86) than Israel (72). It is doubtful whether the Palestinians would have achieved that recognition without the use of terrorism as one of their strategic tools.

It can be argued that 9/11 was a strategic success as well. The US response in the form of an invasion of Afghanistan and Iraq was met with wide discontent, particularly in the Middle East. The development of the Arab spring a few years later can be perceived as a direct result of the American military moves. An even stronger case can be made for the formation of ISIS as a response towards the US aggressive policy in the region. And while bin Laden himself was reported shot and al-Qaeda lost many of its assets and strength, the idea of pan-Islamism is stronger today than it was before 9/11.

All of this raises the question of how an act of terrorism fits into the previously outlined communication model and which aspects of its planning and execution proved to be particularly important in achieving the set goals?

Communication Analysis of Terrorism

Returning to the different elements from earlier, we can assume that everything starts with a 'sender' (or the person who encodes the message and afterwards initiates its

transmission).As Post noted, ‘because of the diversity of terrorist groups and causes, there is no one terrorist ‘mindset’ (1984, p.152).Or to put it in other words, we cannot actually expect to have a single set of features for the ‘sender’. They are different in every single instance of terrorism and even though there might be some overlapping, we cannot draw conclusions on the basis of personal features.

What we can note in regards to the ‘sender’ are the intentions. Perceiving terrorism as a communication act allows us to explore the aims of the strategic approach. Perl has attempted to list all possibilities related to the sender/terrorists’ aspirations in such an exchange(1997).His list, as comprehensive as it might be, is still over exaggerating some aspects while neglecting others.However, he does list 4 terrorist aims which are probably the most common ones: publicity, understanding, legitimacy and damage to the enemy. If we go back to the case-study of the Munich Olympics, we can easily trace the very same aspirations in the Palestinians.

Publicity was probably the main reason for choosing the Olympic Games as a venue for terrorist activity. Having media representatives from 100 countries provided a perfect platform for extending a message. The successful attainment of this goal allowed them in the long-term to acquire legitimacy for their requests (the speech before the UN) and also to seek support and understanding in people from other nations. As far as damage to the enemy is concerned, the psychological trauma of losing 11 Olympic athletes is immense but it could be argued that in terms of image, Israel did more damage to itself by choosing a particular type of response to the tragedy.

The same model can be applied for the 9/11 attacks. Crashing the planes into the towers in the center of New York creates all the necessary publicity and provides a huge amount of legitimacy and credibility to a previously not-that-well-known group which al-Qaeda was at the time.Furthermore, the demands of al-Qaeda are soon enough supported by extremists from all over the world and their influence in international terms rises.

A similar behavior can be observed by ISIS in recent months. The publication of photos and HD videos of beheadings immediately attracts wide publicity for its ‘unprecedented’ brutality towards innocent and unsuspecting victims. Furthermore, it gives them much needed credibility and legitimizes their actions in the eyes of possible recruits and supporters. The understanding sought and the damage it does to the enemy are slightly different. Apart from killing civilians, ISIS manages to antagonize Western audience not only towards itself as a terrorist organization but towards the Muslim community as a whole, which in turn antagonizes the Muslims even further from the West. A dangerous precedent which was started with the 9/11 attacks but continues evolving on its own.

A key notion relating to the ‘sender’ is that terrorism has a political (and thus rational) motive; such as gaining concessions from another country, culture, etc. (Abrahms,

2006, p. 44). However, these rational motives can (of course) be mixed with less rational affective motives, such as revenge and ideological vindication (Saucier et. al., 2009).

Additionally, when we are examining the role of the 'sender' it is important to note that the terrorists are not a single entity, a concept which seems to elude many authors on the subject. Just as in any other formation, there are leaders and followers. And these two types of subjects have their own sets of very distinctive characteristics. If we look at the 'root causes' idea, for example, we might easily conclude that it is indeed practical as means to understand 'specific incidents and certain categories of terrorism' but are 'less helpful in describing and explaining terrorism as a general phenomenon' (Newman, 2006). As O'Neill has noted, 'poverty of resources, combined with poverty of prospects, choices and respect, help enable terrorism to thrive' (cited in Newman, 2006, p. 751). Nevertheless, modern terrorist organizations also require management and technological skills which can be found in the upper and middle classes. Thus, many terrorist organizations consist of a leadership, often people from the middle and upper class, and following or foot-soldiers gathered from the poor population.

Of course, this is not a solid rule but more of a possibility for context allowing further interpretation on the subject. If we do assume such a scenario, then the leadership would be the communicators forming the message and planning its transmission. The foot-soldiers, just as in the case of Munich, would be mere messengers or the 'channel' through which the message is conveyed. The 'channel' in most communication processes is relatively easy to define. Just as in many other aspects, here 'terrorism' proves much more complicated. If we take into account the purely physical setting, the communication channel for a terrorist attack would be the media and that can include any of its representatives. It is worth mentioning that the media and the journalists in particular are separate actors from the government and the terrorists and hopefully the victims. Thus, they have their own agenda which is mostly related with reporting the story in a timely and professional manner, protecting their ability to function and the society's right to know. However, the channel through which the message is conveyed encompasses one more key actor in the communication process – the direct victims of the attack.

The immediate human victims of violence are generally chosen randomly (targets of opportunity) or selectively (representative or symbolic targets) from a target population, and serve as 'message generators' (Schmid and Jongman, 2005, p. 74). The media itself is simply transmitting the events but the actual message of the terrorist act is delivered through several means and with the rise of anonymous terrorism it is mostly related with the victims of the attack. There is a consistent pattern of symbolic or representative selection of the victims or objects of acts of terrorism (Hutchinson, 1972, p. 15). The victim is never completely random. Even in the cases when it might seem like that on the outlooks.

In Munich, the 11 Israeli Olympians were obviously precisely chosen victims and conveyed the idea of the Palestinian struggle against Israel. Quite a different notion can be observed in the Birmingham pub bombings of 1974, when seemingly random people died as a result of the explosions. What must be taken into account is the fact that these people were in British bars and particularly in Birmingham – the second largest city in the UK. The message was clear – ‘there can be no security in the UK until there is a free Ireland’. Even when the Provisional IRA officially denied responsibility and the act was claimed by a small group called Manchester Brigade of Red Flag 74, the idea of the Irish struggle was still there as the girl who phoned the news agency in London and made the announcement also claimed to have trained and received explosives from the IRA. The same notion can be traced in Osama bin Laden’s statement after the attacks:

You may then dispute that all the above does not justify aggression against civilians, for crimes they did not commit and offenses in which they did not partake: [...] the American people are the ones who choose their government by way of their own free will; a choice which stems from their agreement to its policies. [...] The American people are the ones who pay the taxes which fund the planes that bomb us in Afghanistan, the tanks that strike and destroy our homes in Palestine, the armies which occupy our lands in the Arabian Gulf, and the fleets which ensure the blockade of Iraq. (bin Laden, 2002)

Even for 9/11 there is a rational definition of the target. Even more so when considering the idea of the World Trade Center as a monument of liberal democracy and capitalism. Thus, the role which the terrorists and the victims play in the communication model presented in this work is significant. They serve as a communication ‘channel’ and it is through them that the message itself is encoded. Some authors have suggested a concept of perceiving a terrorist incident as ‘the collective message itself’ (Fischer et al., 2010, p. 692). This is a useful approach when it comes to the dissection of the message structure.

Terrorists can translate the meaning of the attack by integrating attributes of the sender (e.g., the terrorists’ perceived identities and motives), the act (e.g., the specific mechanism of the incident, its scale and brutality, and how long it was planned for) as well as perceived attributes of their own society or culture (e.g., its perceived threat level or vulnerability) (Fischer et al., 2010, p. 695).

If we look back to our case study, we can easily note the exact elements of the attack which shaped the message. The terrorists were identified as Palestinians. Their request for hostage exchange further developed the idea that the Palestinian cause was their prime motive. And as noted earlier, their victims were not random at all. Turning towards the recent events of 7th July 2005 and the London bombings, we can see a

similar pattern. Four terrorists have managed to cause the death of 52 victims. The attack has a devastating effect upon the population and spreads terror.

The message itself is conveyed through several important aspects which include not so much the victims but the terrorists themselves and the property destroyed. The fact that the attacks were carried out in the London underground (and one on a bus) is a clear signal that the terrorists are targeting the infrastructure and through it – the state itself. The message is related to the inability of the state to serve its primal function – provide protection for its citizens.

Other aspects of the message are conveyed through the profiles of the terrorists. All of them – young people (the oldest one was 30 years old), three of the bombers – British-born sons of Pakistani immigrants, all of them followed the Islam, all of them were ‘clearskins’¹³⁴. This presents on a subconscious level the information which the message is meant to contain. The fact that such young people were ready to sacrifice their lives in the ‘battle of Islam’ is a notion of determination. To the Arab world, it is a signal for stronger unification and to the West, it is a sign that security is no longer a part of their society. Especially interesting is the case of Germaine Lindsay – born in Jamaica and later converted to Islam. At the time of the attack, he was months away from becoming a father for the second time. The fact that he chose to sacrifice himself in a suicide attack rather than staying with his family is pointing towards severe ideological reasoning rather than disagreements with his wife, for example. ‘And throughout history, suicide attacks are often used to disseminate feelings of fear, loss of control and helplessness. The suicide bomber is the most difficult to detect weapon in military history’ (Fischer and Ai, 2008, p. 340).

All of this leads to the consideration of the utility of terrorism as a ‘[communication] strategy employed by actors who believe, rightly or wrongly, that through such means they can advance their goals’ (Newman and Smith, 2008, p. 576). And in order to do that, they need to get a message across to the right ‘receivers’.

If we examine this particular element of the communication chain in closer detail, we can easily note a mistake which some authors (Fischer et al., 2010) are making, namely – perceiving the receivers as a single entity. Crelinsten makes a much better effort by distinguishing between ‘targets of demands’ and ‘targets of terror/attention’ (2002, p. 84).

Often, the first category relies to a state actor in the face of one or several governments. All governments have different approaches and readings on terrorism as a phenomenon but more often than not, they are attempting to deny the terrorists an access to a platform and discredit them by presenting their acts as simple criminal activity. The second set of ‘receivers’ is normally the general public. However, even here we must take note of different sub-categories. People living in a certain type of cultural environment with its own societal rules might perceive news about a terrorist

¹³⁴ Clearskin – a term describing the person as previously unknown to authorities.

attack quite differently than people from a significantly different cultural upbringing, holding a distinctive set of values.

Such an example is easily spotted in the case-study of Munich, described earlier. The Western societies had a strictly negative and judgmental response towards the events while the terrorists were regarded as heroes throughout the Arab world. This leads us to the conclusion that different segments of the general audience respond differently to terrorism as a communication strategy. Thus, the general principle expressed by notable authors like Heidegger (2002) and Huntington (2011) about the importance of the cultural upbringing in the perception of the world around us is just as valid when applied to terrorist activity. And it can be seen just as clearly in the last element of the communication model – the ‘feedback’.

Here we have the response of the receiver, often the government, but also the general population towards the act of terror. Hutchinson has noted that in its core, terrorism is ‘intended to have psychological influence on politically relevant behavior’ (1972, p. 15). So, the feedback is an essential part of concluding whether the communication strategy has been successful. Terrorism wins only if you respond to it in the way that the terrorists want you to, which means that its fate is in the hands of the ‘receiver’, not the ‘sender’. ‘That is the ultimate weakness of terrorism as a strategy’ (Fromkin, 1975, p. 281).

Thus, ‘the most significant costs imposed on Americans by the successful terrorist attacks of September 11, 2001, undoubtedly are those arising from the erosion of individual freedoms, private property rights, limited government and the rule of law’ (Rathbone and Rowley, 2002, p. 219). It all comes to finding the proper response to the challenge presented by the terrorists. And when forming such a response, one must never forget that the provided ‘feedback’ is just as much a strategic form of communication as the initial act of terror.

In this regard, invading Afghanistan and Iraq with the full military force of a superpower might not be the most sensible decision. The same can be said about the assassination of people even remotely connected to the original event as was the case with the Israeli ‘feedback’ after Munich. Such a violent response often restarts the pattern of terror exchange. As English has noted, maintaining a strong credibility in counter-terrorism argument is an essential part of preventing future instances of terror (2009, p. 139).

Conclusion

Different scholars have acknowledged (e.g. Laqueur, 1986) that the notion of eradicating terrorism in a non-violent manner is absurd, relates more than anything to the world of abstract ideas and is rarely applicable to the real world – never quite free of conflicts. This is what makes it crucial to find the right balance. Just like in any other form of strategic communication, it is essential to keep an eye on the long-term goals and at the same time manage the exchange in the present moment thoughtfully.

A completely non-violent response might render the efforts made to eradicate this phenomenon pointless while an overly aggressive approach runs the risk of antagonizing the general audience even further and legitimizing the terrorists' cause.

Martin Luther King Jr. said that the riot is the language of the unheard. He suggested that rioting is a form of communication people adopt when other channels are blocked (cited in Crelinsten, 2002, p. 77). The very same idea can be applied to terrorism. And it is of utmost importance to keep one's credibility when dealing with such sensitive issues. It is as much true for our case study and the complicated relationship between Palestine and Israel, as it is in many other instances of terror. The essence of any terroristic activity lies in a desire to be heard, to be taken into account and to play a role in the political development. Terror might be a radical approach but more often than not, there is a rational background which has led to the particular escalation of a conflict.

Prominent scholars who have investigated this phenomenon over the years claim that the cultural differences are irresolvable and different civilizations are bound to find themselves on the opposite sides of a conflict (Huntington, 2011). And while there is more than a single argument to support such a stance, it is dangerous nonetheless. For if it is true, then the only means to eradicate terrorism is through the annihilation of an entire civilization until only one remains. And even if we assume that the so-called West ends up on the winning side, the ideological sacrifices which this would require will certainly result in the mutilation of our own civilization and the very ideals it is based upon. Hence, we must continue our search for a peaceful way of coexistence and mutual understanding and any form of radical violence, even as a response to such a move, can be considered a step in the wrong direction.

'Not only lives, but ideals of liberal democracy are threatened by terrorism' (Price Jr., 1977, p. 295). As true as it might be, we must be careful and take note of the fact that the actual threat lies as much in the hands of the terrorists as it does in our own.

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Part V

Economy and Management

Is Gold Really in Action in Turkey?

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ABSTRACT

Turkey has been a significant gold importer since 1985 for three reasons: The production of gold is on a limited scale, high gold demand is pretty tied to traditions and Turkish consumers have seen gold as an effective hedge against inflation and currency weakness. Turkey's gold foreign trade can be classified into two groups as untapped gold and processed gold. Untapped gold states gold bars and processed gold presents gold jewellery. We observe from the available data that Turkey is importer of untapped gold and exporter of processed gold for almost 30 years. Since 2001, two things have changed regarding this situation in Turkey: Turkey started to produce gold through gold mining and also started to export untapped gold.

World Gold Council published a report in January, 2015 named "Turkey: Gold in Action" that discusses the economic contribution of gold to Turkey's economy and the increase in gold export in last year's raised the interest whether foreign trade of gold has an impact on economic growth. This paper aims to search the answer of this question by analyzing the impact of gold export and import on economic growth of Turkey for the period 2001:Q1-2014:Q4 with an econometric model. Augmented Dickey Fuller Test and Ordinary Least Square Method are applied to our model.

Key words : Economic Growth, Gold Export, Gold Import

JEL Classification: F43, C22

1.INTRODUCTION

According to the data of World Gold Council in 2012, global gold supply reached 4453 tons in 2012. Approximately two thirds of new gold supply each year comes from mining and remaining one third comes from the recycling of gold. So, gold mining and recycling are two ways to supply gold. Mines in the top 15 gold producing countries extracted 2177 tons of gold in 2012, % 76 of the world total. The six largest producers are China, Australia, the United States, Russia, Peru and South Africa. These countries extracted more than half of the gold mined globally. (World Gold Council Report, 2013). Recycling of gold is the other significant source of gold supply accounting for around 36 % of global supply in 2012. The location of gold recycling activity is not tied to mine production and is more likely to be linked to gold consumption. Data limitations including the lack of information on the countries, in which recovered gold is subsequently refined, mean that the gross value added (GVA) of gold recycling cannot be estimated at the country level. Instead, the analysis is limited to the global level.

Turkey has a small but growing gold mining industry. The industry started to develop in 1985 when new regulations were passed. A wave of foreign and domestic investment followed leading to the discovery and development of several large-scale gold deposits and a sharp increase in gold production. Gold production has increased almost every year since 2001 when Ovacık which is Turkey's first modern gold mine went into full-scale operation. Total production has grown from 2t in 2001 to 33.5t in 2013, a ten year compound annual growth rate of 20 %. While this growth has been impressive, it may only represent a fraction of Turkey's mining potential. The Ministry of Energy & Resources estimate gold reserves to be 840t and resources could be as high as 6500t (WGC Turkey Report, 2015).

Over recent years, gold recycling has taken on greater significance. While mine production grows from small base, gold recycling is well established. Refiners play a key role in this fluid gold market with sizeable levels of recycled gold being imported as well as generated domestically. With a well-developed post-production supply chain, Turkey has ambitions to become a regional refining and recycling hub. Turkey has a number of large-scale refiners which refine and recycle gold. Thanks to these accredited refineries, Turkey imports approximately 15-20t of recycled gold annually. The majority of this gold is used to meet local demand while the rest is re-exported. Turkish culture and traditions are closely related to the gold, but it is not just local demand that is strong. Turkey's jewellery industry benefits from exports and healthy tourist trade.

Turkey's gold jewellery exports boomed after export restrictions were lifted in 1983. Turkey has been the world's second largest exporter of gold jewellery after Italy. Its biggest export market is the Middle East, but it also exports to USA, Russia and Germany. These jewellery exports have had a positive impact on Turkey's trade balance. Between 1998 and 2013, the value of Turkish jewellery exports, most of which was gold, increased from \$209mn to US\$3.3bn, generating valuable overseas earning. Turkey sells a lot of gold jewellery to overseas visitors as well, especially those from Russia and other Commonwealth of Independent States countries. According to the Ministry of Economy's Gold Jewellery Report published in 2012, jewellery exports and tourist demand accounted for around 70 % of the jewellery sector's fabrication in 2012.(Gold Jewellery Report, 2012).

This study aims at finding the impact of gold export and import on economic growth of Turkey. We know from the data that gold's value chain makes a significant contribution to Turkey's economy. In 2012 alone, gold fabrication, consumption and recycling added at least US\$8.8bn to Turkey's economy. The value chain supports 5000 gold fabricators, 35000 retail outlets and employs about 250000 people. This does not even include 6200 people employed by gold mining companies. And between 2009 and 2013, the three largest mines together invested over US\$1bn in project expansion and ongoing capital expenditure.

II. LITERATURE REVIEW

An economic report by World Gold Council named “The Direct Economic Impact of Gold” exists regarding gold production, gold trade and their contribution to the trade balance, economic growth and budget deficit. WGC also has specific reports for countries dealing with gold trade. Also, Central Bank of Turkey published a report in 2012 named “Gold in Turkey: Its Effect on Foreign Trade, Balance of Current Accounts and Economic Growth”.

Besides these reports, unfortunately, we cannot find many studies regarding gold trade. The main drawback for researchers to work on this topic is the limited availability of data.

Bloch and Owusu(2012) examined the contribution of gold mining to economic growth in Ghana’s economy through an empirical study. Ghana is the second-ranked African producer of gold and it is ninth in world scale and especially since 2000, gold production values and revenues rose significantly over the decade. Despite this reality, gold mining is often depicted as having an enclave status, disconnected and isolated from the rest of the economy. This study proves against this understanding.

Kumah(2006) examines the environmental performance of the gold mining industry in developing countries and its impact on resident populations and communities. He claims that although gold industry has many drawbacks such as pollution of the environment, it can potentially confer many benefits, especially for the people of developing world by providing employment and foreign exchange.

Keatley(1992) has a conference proceeding regarding Africa’s gold potential. There are several other studies that show the contribution of mining sector to sustainable economy and these studies also include gold mining. Jonah (1987), Sachs and Warner (1999), Humphreys(2000) can be given as an example.

III.DATA

In the study, for the econometric model, quarterly indicators of economic growth, export of untapped gold and import of untapped gold are employed for the period from 2001:Q1 to 2014:Q3. Economic growth is represented as annual change of seasonally and calendar adjusted expenditure on the gross domestic product.(base year 1998). This data is sourced from Central Bank of Turkey. Untapped gold import and untapped gold export data sets are sourced from Turkish Statistical Institute(TÜİK). The existence of seasonality is tested through dummy variables and we could not find any seasonality in our data set.

IV. METHODOLOGY AND MODEL

The aim of this study is to explore the impact of gold export and gold import on economic growth by employing Ordinary Least Squares Method. The model can be described as follows:

$$Y_t = \beta_0 + \beta_1 \text{EXPORT}_t + \beta_2 \text{IMPORT}_t + \varepsilon_t$$

Y : Economic Growth (Growth Rate of GDP)

EXPORT : Export of Untapped Gold

IMPORT : Import of Untapped Gold

ϵ_t : Error Term

In time series analysis, if a series does not have a stochastic trend and is stationary, it is said to be integrated of order zero or I(0). If a series has random walk trend, it is said to be integrated of order one or I(1) (Stock & Watson, 2007). The null hypothesis for the non-stationarity is tested. The results of the Augmented Dickey Fuller for unit root are provided on Table 1.

TABLE 1: ADF TEST RESULTS: LEVEL			
	ADF TEST RESULT	ADF CRITICAL VALUE (%1)	ADF CRITICAL VALUE (%5)
Y	-3.7123	-3.5601	-2.9176
EXPORT	-7.7351	-3.5574	-2.9165
IMPORT	-3.0074	-3.5654	-2.9199

The findings reveal that variables Y, EXPORT and IMPORT can be considered as stationary at level. Thus, these variables are I(0). In time series analysis, if the data set are not stationary and we estimate it with ordinary least squares, results can direct us to an econometric term “spurious regression”. Spurious regression is the one in which time series variables are non-stationary and results of regression are deceptive. Many time series techniques are developed for this reason after 1980s. In our data set, since all variables appear to be stationary, the results of ordinary least square estimation will be reliable. This is the reason we employ this methodology in our study. Estimation results are provided on Table 2.

TABLE 2: ESTIMATION RESULTS		
	COEFFICIENTS	P-VALUES
C	5.481	0.0000
EXPORT	-0.006	0.0367
IMPORT	-0.011	0.0554

R²	0.621	
Adjusted R²	0.599	
Lagrange Multiplier Test	9.2956	0.0561
Breush-Pagan-Godfrey Test	1.266	0.5010
Akaike Value	6.2535	

In order to examine the reliability of the model, the effects of heteroscedasticity and autocorrelation are examined by running several diagnostic tests. For heteroskedascity, Breush-Pagan-Godfrey test is employed and existence of homoskedascity is confirmed. For the simplicity of interpretations, p-values of the tests and coefficients are provided. If p-value is smaller than 0.05, we conclude that we reject null hypothesis. For Breush-Pagan test null hypothesis shows the existence of homoskedascity and alternative hypothesis shows the existence of heteroskedascity. Since p-value: 0.5010>0.05, we cannot reject null hypothesis. Similar result is valid for autocorrelation. To detect autocorrelation, we run Lagrange Multiplier test. The null hypothesis is “there is no autocorrelation in the model” can not be rejected since p-value: 0.06>0.05. For autocorrelation, we use “4” lags for the test, because quarterly data set is used in our analysis. It makes DW test results invalid, because DW is calculated by only “1” lag. R² measures how well OLS regression line fits the data. Adjusted R² which is more suitable for comparing models with different numbers of independent variables for our model is around 59 %. It means that the model (independent variables) explains 59 % of the variance in dependent variable.

P-values of coefficients Export and Import show that both variables are significantly affecting economic growth at 5 % significance level. One percent increase in export decreases economic growth 0.006 percent. One percent increase in import decreases economic growth by 0.01 percent. First of all, magnitudes of coefficients are quite low since economic growth can not only be explained by these two variables. Omitted variables can decrease the power of the model. Second of all, negative signs of variables can be explained by the structure of data set. In our statistics database, only untapped (raw) gold import and untapped gold export data are available and as our study proves that there is not positive contribution to economic growth from untapped gold. Gold production and processed gold can contribute to our economic growth much better. As we expressed in introduction part, Turkey has been one of the largest exporter of gold jewellery and since 2001, we started to produce our own gold through mining in Ovacık, İzmir.

V.CONCLUSION

This study is an ongoing work. The biggest limitation is the availability of the announced data sets. Our next goals can be summarized as follows: We now have export of processed gold export on annual basis for the period of 1990-2012. During this period, we have three financial crises in Turkey, so data set is pretty affected by

structural breaks. We can eliminate these structural breaks from data set through some techniques, but it is loss of information as well. If monthly or quarterly data of processed gold export is calculated by Turkish Statistical Institution, we can also search for the effect of processed gold export on economic growth.

As we expressed before, gold production started in 2001 in Turkey. We have annual data for 2001-2013 period and monthly data by Borsa İstanbul for 2008-2013 period. For such a short period of time, it is hard to catch some trend at this point, but in five years, the effect of gold production on economic growth of Turkish economy can be calculated as well. We expect that this production-based approach will provide much better models.

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HUMAN RESOURCE MANAGEMENT PRACTICES IN MICRO COMPANIES

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ABSTRACT

Micro companies are a starting point for businesses and they represent an important share in the total number of firms. These businesses are highly subjected to failures, especially those that are at the beginning of their business life cycle. Poor management is considered as one of the main factors that cause the failure. In modern business, the most important assets of an organization are human resources and effective management of it leads to higher performance. In order to be competitive, nowadays organizations are directing their focus toward Human Resource Management (HRM) practices.

By reviewing the literature, it can be seen that most previous works regarding the usage of HRM practices and their impact on performance were focused on large companies. In the last decade, we have a shift of this focus toward the small and medium enterprises. However, in these researches, the area regarding the micro companies is highly neglected. Most studies have chosen samples of companies that have a minimum of ten employees. Still, these choices are not supported by the literature, but they are mostly made based on assumptions that in companies with less than ten employees it is hard to expect the usage of HRM practices.

Because of that, this study aims to investigate the usage of HRM practices and their impact on performance in micro companies. The results of this study should be meaningful to HRM literature regarding micro companies and give us the evidence about should we include these types of companies in the samples.

Key words: business performance, human resource management, micro companies

1. INTRODUCTION

Modern business environment is characterized as highly dynamic and highly competitive. (Katou, 2011) Today, managers are faced with the big and quick changes. In the last few decades we are witnessing a change of the basic approach to business and management among which is change in the concept of capital, where in the past it was closely related to finance and accounting and the officers of these departments were responsible for it, while today this concept is more oriented toward people or as modern literature states the human capital. (Siber, 1999) The main weapon in competitive business environment is concentrated in human capital.

Today, it is not possible to hire a “finished” product since business is constantly changing. That is why organizations are directing their focus to Human Resource Management (HRM) practices in order to follow the trends of the market and to gain competitive advantage over its rivals. (Barney, 1991) According to Umer (2012) higher emphasis on HRM in Small and Medium Enterprises (SMEs) is a comparatively new phenomenon. Human resource management is a field that has been analyzed mostly in the large companies, while SMEs were treated as second class citizens. (Tansky & Heneman, 2003) The focus of research has shifted and small and medium enterprises got more attention in the recent years which will be shown in the following parts of the study. Even though we have the shift in the research, micro enterprises, which represent a large portion of companies within a country, are often neglected in HRM research.

Because of it, this study aims to examine the relationship between HRM practices and organizational performance in micro enterprises. Everything planned, developed and implemented inside and outside of the organization is done, to the greatest extent, by people. HRM practices are always expected to have effect on organizational performance, since human capital represents the most important asset of the organization. By testing the relationship we try to see if there is a significant or positive relationship among the variables.

2. LITERATURE REVIEW

The focus on human resources, as an area where companies may gain their competitive advantage, has increased in the last decade. Today, it is undoubtable that productivity, globalization, competitiveness and change cannot be achieved without accurate and comprehensive understanding of human resources. Man is no longer a marginal organizational resource but rather a significant source of new value. (Dzubur, 2003)

The main strength of the organizations are people and that is why it is so important for organizations to choose the right people and to manage them in the best possible way. It is important to observe people as individuals with own needs, want, desires, ways of motivation and thinking in order to exploit that information and direct people toward the organizational goals. (Dzubur, 2003 p.46) According to Sladovljev, Sisara & Boban (2007, p.63) human capital plays an important role in the implementation of business strategy. In this context he identifies external strategy as a way of competition and internal strategy as way of developing, engaging, directing, motivating and controlling the internal resources.

2.1 Approaches to HRM

In the last period, integration approach is one of the dominant fields in the research of HRM according to Katou & Budhwar (2014). This approach is based on the

relationship among development of HR strategy and its impact on organizational performance. From it three types of integration have been developed through time:

- Horizontal integration from which the universalistic model has been developed.
- Vertical integration from which the contingency model has been developed.
- Combined integration from which the configurational model has been developed.

When we talk about HRM and when we try to explain the HRM and performance link, we look to three main theories that are used by the researches: universalistic, contingency and configurational. (Delery & Doty, 1996; Martin-Alcazar, Romero-Fernandez & Sanchez-Gardey, 2005; Waiganjo, Mukulu & Kahiri, 2012)

2.1.1 Universalistic approach

Sometimes also called best practice represent model in which performance is affected by already identified most important practices. Individual HRM practices are employed and their relationships with performance have been analyzed. (Gooderham, Parry & Ringdal, 2008) In the simplest model, HR practices and business strategies are not mutually dependent. (Katou & Budhwar, 2014) Here, the assumption is that universalistic practices work in all settings.

Analyzing the work of Osterman (1994) and Huselid (1995) Katou & Budhwar (2014) stated three main assumptions regarding this model: (1) there should be linear relationship between HR practices and performance; (2) best HR practices are universally applicable; (3) key concept is internal fit. However there is no single approach but rather different approaches. For example Pfeffer (1994) proposed sixteen HR practices, which in his later work (1998) he reduced to seven. Huselid (1995) used the thirteen best practices while on the other hand Hamid (2013) in his analysis uses only six of them. Other researchers also modified the best practices according to their needs.

There are also facts that obscure this approach. Martin-Alcazar, Romero-Fernandez & Sanchez-Gardey (2005) states that this approach lacks solid theoretical foundation as it show the problems lack of understanding of crucial variables, construct and relationship. Some of them may be taken from general logic of business such as that each industry has its own characteristics and that as such it shapes organizational practices and thus HR practices. Even if benchmarking is a good technique, management of company has to have in consideration that what works for one organization does not have to work in another. (Waiganjo, Mukulu & Kahiri, 2012)

2.2 Human Resource Management Practices and Organizational Performance

Since the modern business is changing more and more each day and organizations are trying to survive, they have to ensure that their workforce is ready to adapt to different activities and duties in the short and long run. (Anyadike, 2013) According to Anyim, Ekwoaba & Anthony (2012) these modern trends such as globalization, information technology, environmental instability and demographic shifts have made the HR planning more complex and harder to manage. Building the competitive workforce is the ultimate goal of modern organizations and thus they employ different HRM practices for which they believe to have impact on company's performance.

2.2.1 HRM Practices

Human resource management is much more interesting and motivating than management of any other resource. The main reason is that resources are human beings and by this we refer to the nature of changing, making mistakes, having different attitudes, beliefs and etc. That is why for effective HRM we need to develop an HRM system which is supported by HRM practices. (Tiwary & Saxena, 2012, p.669) They explain HRM practices as managing the pool of human resources and assuring that they are directed toward the organizational goal. HRM practices represent a process or a way that organizations use in order to hire and manage people. Covering a high number of activities, these practices have been built on the theories of organizational behavior, strategic management and human capital. (Armstrong, 2009, p.4)

Since most of the researches are micro focused, which means that they are mostly applicable in the country of research, many organizations today are trying to find the best practices for international markets. Because current trends are forcing organizations to look outside of their domestic boundaries, organizations are becoming more interested in this topic since they are fully aware that through HR they may increase competitiveness. (Geringer, Colette & Milliman 2002) Delery and Doty (1996) work, which is a ground base for this research, proposed seven universal HRM practices which include internal career opportunities, training, appraisal, profit sharing, employment security, employment participation and job description)

2.2.2 Organizational performance

Even if this indicator is mostly used as a variable in organizational literature, it is still difficult to provide one universal definition of it. (Rogers & Wright, 1998)

Measures of performance are different from author to author, but mostly they belong to one of two categories: financial or non financial. (Mutua, Karanja & Namusonge, 2012) It is important to use both categories of performance since initially one will result in another. Dyer & Reeves (1995) proposed four main types in order to measure organizational performance:

- Human resource outcomes such as absenteeism, turnover, and individual or group performance
- Organizational outcomes such as productivity, quality, and service;
- Financial or accounting outcomes such as profit, return on invested capital, return on assets
- Market based outcomes measured by stock value or shareholder return

2.2.3 Relationship between HRM Practices and Organizational Performance

Going through literature, we may spot that there is a tremendous number of works that support the positive and significant effect of HRM practices on organizational performance. HRM practices were analyzed on both individual basis and as a set.

Economical and statistically significant impact of high performance work practices on organizational performance in terms of employees' turnover, productivity and financial performance was found by Huselid (1995). In analysis of banks, Delery and Doty (1996) found positive relationship between ROA and employment security, while profit sharing and results oriented positively affected both ROA and ROE. Innovative set of work practices have higher impact on productivity than the traditional one was confirmed by work of Ichniowski, Shaw & Prennushi (1997). By this work they emphasized the importance of complementarities among the work practices. Higher usage of HRM contributes to lower employee turnover and higher profit per employee is a partial result of Guest, Michie, Conway & Sheehan (2003). Akhtar, Ding & Ge (2008) adopted Delery and Doty (1996) seven HRM practices and tested the impact they have on organizational performance in Chinese context. Their results indicated that four HRM practices had positive and significant impact on both product/service and financial measures of performance while the rest of the practices significantly affected at least one aspect of performance. Malaysian private companies were examined by Abdullah, Ahsan and Alam (2009). They found that four out of six HRM practices (training and development, teamwork, HR planning and performance appraisal) are having impact on organizational performance. Positive relationship was also found in the case of Oman. Here, Moideenkutty et al. (2011) tested high-involvement HRM practices, among which there was highly selective staffing (recruitment and selection), on sample of 87 companies. Singh, Sharma & Kaur (2011) found, as they say, noticeable effect of the performance appraisal on organization. In Indian case, these authors tested relationship between performance appraisal and organizational performance variables in manufacturing and service sector. In both of them relationship was significant and positive. Positive and significant relationship between HRM practices (staffing, incentive and training) and organizational performance in sample of 140 banks was found in the work of Saeed et al. (2013) Training is the HRM practices that has been widely examined. Positive relationships between training and development and organizational performance have

been found in different types of organizations such as schools, banks and usual businesses. (Abdalkrim, 2012; Shaheen, Naqvi & Khan, 201

2.4 HRM in micro companies

Going historically, 90s were years of focusing on large companies, while in 20s we have shift to Small and Medium enterprises. Micro enterprises are often avoided in these researches of HRM. (Sels et al. 2003; Chang & Huang, 2005; Yasmin, 2008; Moidenkutty, Al-Lamki & Murthy, 2010; Katou, 2011; Khan & Khan, 2012).

However, recently we have certain works that put focus on micro enterprises. (Mattare, Shah & Monahan, 2013) According to Kahando, Ng'ang's & Kyalo (2014) managing of HRs in micro enterprises is done through informal, unwritten and ad hoc practices. In their research, they found positive and significant relationship between HRM function and growth of micro and small companies. Formal HRM practices in micro companies were found in the work of Junaidah & Ismail (2011). Further, they found that HRM practices were related to employees' satisfaction and commitment. Concentration on the HRs as the most important assets should be made in order to improve the productivity of micro, small and medium enterprises. (Vettriselvan, Sathya & Balakrishnan, 2014) In its work of SMEs in Ghana, Honeyunga also included micro companies and implied that managers of these organizations should pay attention to HRM in order to become and remain competitive.

From these works, we may spot that there are some grounds to include micro companies in HRM research. Thus, we propose following hypothesis:

H1: There is a positive and significant relationship between HRM practices and micro companies' performances.

3. RESEARCH METHODOLOGY

The data for this research was obtained by using primary data collection method. Self-administered questionnaires were delivered to micro enterprises in Federation of Bosnia and Herzegovina from which we obtained 71 responses. Since our performance measure was based on 3 years period, 2 enterprises were excluded which brought us to 69 usable responses. The small size of a sample is a result of time and cost constraints.

In Federation of Bosnia and Herzegovina, the criteria, according to the Law on the Promotion of Small Business Development of FBiH, are presented in the table below.

Table 1: Bosnia and Herzegovina criteria for SMEs
(Tuzla Canton, Ministry of Development and Entrepreneurship, 2012)

Company category	Assets (mill. Of €)	Revenue (mill. Of	Employees
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		€	
Micro	0.20	0.20	0-9
Small	2.00	2.00	10-49
Medium	15.00	20.00	50-249

This study uses both types of data; secondary by using prior works and primary by collection of the data. Primary data was collected by cross-sectional questionnaire based on 7 and 5 point Likert scale (from strongly agree to strongly disagree). The questionnaire was constructed by using several prior works in the field of HRM and performance. Thus in order to measure HRM practices, we used the Delery & Doty (1996) work. In order to measure performance, we used the work of Delaney & Huselid (1996).

3.1 Measures of variables

This study includes data on three dependent, seven independent, five control and eight interaction variables. This study will obtain data at one point by usage of cross sectional survey method.

3.1.1 Dependent variable

The dependent variable is organizational performance. According to Dyer and Reeves (1995) there are four main dimensions of organizational performance; human resource outcomes, organizational outcomes, financial or accounting outcomes and market based outcomes. This typology is widely accepted in the research. For the purpose of this study we selected indicators of three dimensions of performance; market based outcomes, due to the nature of the sample, were not chosen.

As it concerns performance measures, this paper uses a subjective way of measuring performance. Although objective measures are preferred, subjective measures may be used for several reasons: (Dess & Robinson, 1984; Dawes, 1999)

- Unwillingness of managers to provide objective data especially if they consider it as confidential or commercially sensitive
- Subjective measures are preferable if we compare profit measures in cross-industry studies. Industry effect on variation of profit levels can diminish the relationship between practices and organizational performance. Thus with subjective measures profit indicators can be used in comparison to the industry.
- Financial measures such as profitability may misrepresent the situation of the company especially in phases of high investments.

- Finally, in the literature we have several studies that showed high correlation between subjective and objective measures of performance such as in cases of Dess & Robinson (1984), Pearce, Robbins & Robinson (1987) and Venkatraman & Ramanujam (1985)

Taking it into consideration together with the framework proposed by Dyer & Reeves (1995) and Delaney & Huselid (1996) we decided for the following variables:

- Financial indicators: profitability, market share, sales
- Organizational indicators: productivity, quality of products/services/programs, customer satisfaction, development of new products/services/programs
- HRM outcomes: ability to attract employees, ability to retain employees, relationship between managers and employees and relationship among employees in general
- Market based outcomes: None

3.1.2 Independent variables

Independent variables are HRM practices. In the literature review we already stated that there are no globally accepted set of practices for which we may say that they represent the universalistic approach. However, going through literature we may spot that some of the variables are more used in the research than others. Pfeffer (1998) proposed seven practices that characterized most of the HR system that produces the profit for the organizations. On the other hand, classical textbooks divide HRM practices into four areas: resourcing, appraising and developing, compensating and employees relations. (Torrington, 2005; Mejia, Balkin & Cardy, 2006; Desler, 2012) This study adopts Delery and Doty (1996) approach to measuring HRM practices. The following variables have been selected:

- career development (internal career opportunities)
- training
- results oriented appraisal
- employment security
- employees participation
- job descriptions
- profit sharing

3.2 Data analysis

This study performs several analyses. At first, data is checked through Cronbach's alpha value in order to determine the reliability which should be $\alpha > 0.70$. This type of reliability analysis is used in most of the research mentioned in the previous part of the paper.

To explain the profile of respondents we used descriptive statistics. Descriptive statistics are used to analyze characteristics of the sample. In simple words descriptive statistics are procedures used to summarize, organize, and make sense of a set of scores or observations.

In order to determine the presence of multicollinearity, Variance Inflation Factor (VIF) was used. Even though there is no precise number that indicates multicollinearity there are some general accepted values. Values above 5 indicate that variables are high correlated.

In order to test the hypothesis (examine the effects of seven HRM practices on performance in micro enterprises), we run multiple regression analysis.

4. RESULTS

4.1 Reliability

The strength of uniformity of instrument and goodness of measure was measured by Cronbach alpha, which can be seen by the table below.

Table 2: Reliability statistics

Cronbach alpha	Number of Items
0.88	23

From the results above, we can see that the questionnaire upon which we obtained data was reliable.

The sample of the study was based on micro enterprises in Federation of Bosnia and Herzegovina. The following table shows characteristics of data obtained.

Table 3: Profile of respondents

		% (out of 69)
Age		
3-5	5	7.25%
6-15	30	43.48%
Over 15	34	49.28%
Size (avg.)	5.4	
Industry		
Manufacturing	15	21.74%
Service	26	37.68%
Trade	23	33.33%

Other	5	7.25%
Founder owner	45	65.22%
Gender of manager		
Male	55	79.71%
Female	14	20.29%
Education		
High school	25	36.23%
Bachelor	25	36.23%
Master	17	24.64%
PhD	2	2.90%
HR staff employed	6	8.70%

Only 7.25% of data belongs to companies that are in business from 3 to five years, 43.48% are companies between 6 and 15 years, while the largest share of companies belong to those above 15 years of existence. As it concerns industries in which they operate, 21.74% are manufacturing companies, 33.33% are trade and most of companies are dealing with services (37.68%). Companies that do not belong to any of these three categories are represented by 7.25%. More companies in this sample are those founded by its manager (65.22%), while most of managers are males (79.71%). Educational background of managers is equally staggered between those with high school and undergraduate university degree. Master and PhD title holders represent 27.5% of the sample.

As it was expected, the employment of HR staff is pretty low (8.7%).

4.2 Multicollinearity

Variance inflation Factor was used in order to test presence of multicollinearity and is presented in the table below.

Table 4: Test of colinearity

Independent variable	VIF	1/VIF
Internal career opportunities	1.93	0.52
Training	1.84	0.54
Performance Appraisal	1.70	0.59
Employee Security	1.62	0.62
Employee Participation	1.59	0.63
Job Description	1.39	0.72
Profit Sharing	1.24	0.81
Mean VIF	.14	

From the table above, we may conclude that there is no presence of multicollinearity among independent variables.

4.3 Regression results

In the table below we present the model tested in micro enterprises.

Table 5: Regression results

Independent variable	Model 1	Model 2	Model 3
Internal career opportunities	.08	.01	.11
Training	.08	.13***	.14***
Performance Appraisal	-.12	-.01	.03
Employee Security	-.15	.02	.02
Employee Participation	0.14	-.10	-.11
Job Description	.07	.04	-.04
Profit Sharing	.08***	.04	.01
R ²	.14	.14	.13
Adj R ²	.04	.04	.03
F	1.36	1.41	1.27
Prob > F	.24	.22	.28

At first point let us look to overall regression results. Prob(F) indicates the probability that null hypothesis for full model is true. The Prob(F) results shows us that there are high chances (24%, 22% and 28%) that all regression parameters are zero. Observing the HRM indicators we may see that most of them are statistically insignificant. Variables that are statistically significant are profit sharing in model 1 at 10% and training in Model 2 and Model 3 at 10%. Overall, our model does not provide enough evidence to accept the H1.

5. Conclusion

In this study, we examined the possibility of inclusion of microenterprises in HRM research. We examined the impact of HRM practices on company's performance. Human resources are perceived as the most important assets of organizations in modern business. Even though, they are highly neglected in HRM research, there are some evidence and works that provide supportive evidence of HRM usage in micro enterprises. Base on them, this study was focused on micro enterprises and examined the impact of seven HRM practices on organizational performance that was measured from three aspects. For this purpose, we used universalistic approach.

From the results obtained, we did not found enough evidence to support the inclusion of micro companies. Because of that, this research contributes to already established literature that proposes samples with minimum of ten employees, especially in the research of SMEs.

This study faced several limitations. There is a lack of public database of small organizations and the database used for this study was not updated. Thus initial sample was changed in the data collection process. Several companies were out of

business at the time of data collection. Another problem in the data collection was unwillingness of companies' owners/managers to participate so we do not have "full" generalization of results.

As the research progress, this study throws one question that should be a focus for further studies. It is that research in HRM should deal with micro enterprises in a way of finding the set of HRM practices that can contribute to organizational performance of such kind of organizations. What works for larger companies does not necessarily mean that it will work in smaller settings. Even in this case, there were several HRM practices that had positive and significant impact on organizational performance. In the nature, microenterprises differ largely from other types of organizations and therefore special attention should be given in developing high working practices.

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Quality Assurance in Private Secondary School in Zanzibar

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ABSTRACT

The Secondary education in Zanzibar is provided free in all public schools. However, many parents especial with affluent prefer to enroll their children to private schools with higher assurance for quality and efficient learning.

This study marked out the quality assurance in Private secondary school in Zanzibar wherein quality concerns for parents revolved primarily around the availability, competencies, and responsiveness of teachers. The specific objectives derived from the key aspects of quality education as well as the overall Quality Assurance mechanisms in Private Secondary Schools.

To make data more scientific non-probability with purposeful sampling technique, used to select four schools for case studies; head teachers and Ministerial officers were interviewed to measure quality assurance mechanisms employed. Also questionnaires distributed to students and teachers drawn by stratified random sampling, divided the population of students and teachers separately into subpopulations called 'strata' of 6 Grades from Form I to Form VI separately.

The study revealed different views from school administrators, teachers and students. A good number of students, 78.26% in Private school are enrolled because of quality teaching and learning. In fact, effective school leadership as being a necessary demonstrating quality education, next in importance only to the quality of the curriculum and teachers' instructional abilities. Qualified and effective teachers with a wide subject and pedagogical knowledge, realized key aspect of improving students' performance. Ministry of education persist supervision and support into teaching and learning in schools.

While poor conditions in public schools drive parents in Zanzibar to resort to private schools (78.3%), for their children to achieve quality results. But this widens the manifestations of the gap between the rich elite and the poor. Thus, from this factual perspective, considering the supply side, the government should streamline procedures for opening and running private schools and make completely transparent.

Key words: Quality education, Key aspects, Mechanism, Private school, Zanzibar.

Introduction

1.1 Background of the study

1.1.0 Introduction

The study is about to explore the Quality Assurance in Private Secondary School in Zanzibar where by four schools have been used to find out the answers of the research questions, in the course of the emerging higher number of private schools which weave the education system in Zanzibar to a certain way. This is the first Chapter which comprises different parts, starting with Background informational of the problem in the historical perspective, geographic and demographic of Zanzibar specifically as well as some educational details in Zanzibar, Also a [Statement](#) of the problem is clearly highlighting the magnitude of the problem, following with objectives of the study; Research questions provides the major standpoints that were tested in the data collection, then Significance of the study, Scope of the study, finally Definitions of the key terms.

1.1.1 Socio-economic background

Zanzibar is part of the United Republic of Tanzania, but is semi-autonomous. It has its own Government, a legislative assembly known as the House of Representatives, the Executive, headed by the President of Zanzibar and its own Judicial System. Zanzibar consists of two main islands, Unguja and Pemba, and several other smaller islands. Zanzibar is located in the Indian Ocean, is about 30 kilometres off the East Coast of Africa between latitudes 5 and 7degrees south of the Equator and 36 km from the Tanzanian mainland coast, Its land area is 2,654 km² (Revolutionary Government of Zanzibar, 2010). Zanzibar is faring well in the development of infrastructure. There is a primary school every village and enrolment rate has now reached more than 90% (Zanzinet Forum, 2004).

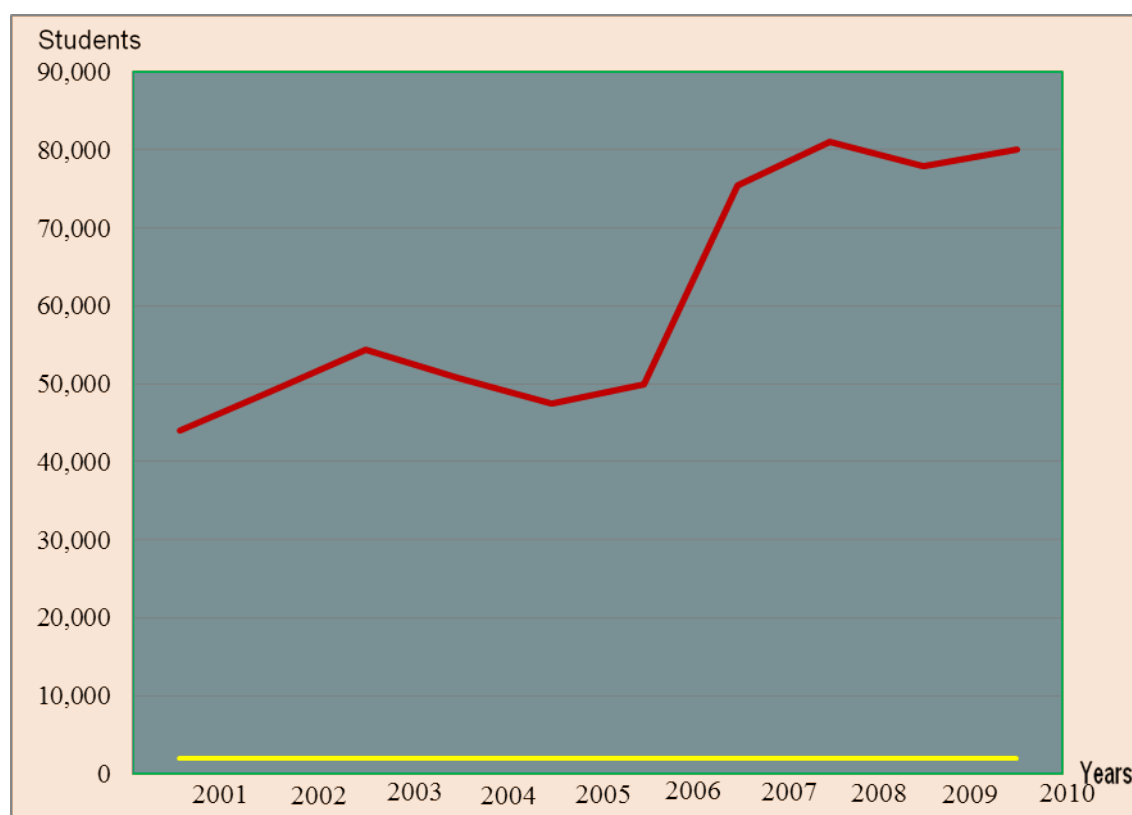
2 Education Structure and Management

Education has been for a long time a high priority in Zanzibar's policies and development strategies. In September 1964, Zanzibar introduced Free Compulsory Education (FCE) from Standard 1 to Form 2. The FCE was introduced as an effort to realize Universal Compulsory Education (UCE) and to attain the Education for All goals (EFA, 2000).

The structure of education system in Zanzibar is in four levels: pre-primary, primary, secondary and tertiary. Zanzibar follows 7-3-2-2-3 system; seven years of primary education, three years of first cycle lower secondary education, two years of second cycle lower secondary, two years of advanced secondary education and three years of higher education. On average less than 40% of basic education graduates proceed to

second cycle lower secondary education which leads to General Certificate of Secondary Education (MoEVT, 2006).

Figure 1. 1 Student enrollment in the first cycle of lower secondary School.



Source: Budget Speech by MoEVT – 2010-2011

A number of private schools have lately been introduced into the educational system in Zanzibar following the policy of free provided in public schools. In 2004 there were 157 pre-schools and 24 primary schools with a combined enrolment of 12,078 and 5,842 children respectively. There were only 12 Private schools with a total enrolment of 1828 children offering secondary education. The contribution of the private sector in terms of GER was 10.7% at pre-school, 2.9% at primary and 1.3% at lower secondary level giving an overall GER of 2.5% at the basic education level (ZEP, 2006).

Year	Total	GER %
2001	94.6	2.4

2002	98.1	2.5
2003	99.1	5.6
2004	100.3	2.9
2005	101.3	3.5
2006	101.6	3.5
2007	104.6	3.9
2008	104.4	3.9
2009	106.8	5.1
2010	112.1	5.2

Table 1. 1 Students enrollment in Private Pre-schools and GER trends, 2001-2010

Source: Ministry of Education, Zanzibar

At Present, there are many private schools including boarding and day schools. This depicts the magnitude of private education as rapidly rising phenomenon that shaping the education system in particular way. Therefore the researcher has able to explore the status of private sector in education, in which the selected private schools at secondary level were taken in to account for assessing the status and measures in the provision of quality education with comparison of public secondary school in Zanzibar.

1.1.3 Description of the schools for the case study

This study get used a case study of four schools in order to examine the provision of Quality education in private secondary school in a detailed manner, in which two schools are Private and other two from public schools:

The International School of Zanzibar (ISZ) is a co-educational independent day school. The school is accredited by the University of Cambridge as an international exam centre, which gives the right to teach and examine IGCSEs and A levels. Teaching staff are fully qualified teachers from 10 different countries and its International student body enrolling just under 160 students representing 29 different countries.

SOS Secondary School in Zanzibar: A total of 800 children are being taught by some 40 teachers at the SOS Hermann Gmeiner School at the moment. The school aims to improve overall academic performance so that more pupils achieve above-average pass rates and pass the CSEE National Exams.

Haile Selassie Secondary School: It opened 1891 as Asians community school known as Sir Euans smith madressa with 200 Indian children. In 1970 it enrolled primary together with secondary student to form III. From 1985 to 2009 was

secondary school only from F I to F IV. In 2009 started to enroll F V Student. So now it is a secondary school from F I to F VI.

Hamamni Secondary School: This is public school. The name of this school was given according to the proximity from which the school is found (village) started in 1925 with 35 students to 1929 as a both primary and secondary school. In 1985 it separated to be secondary school only from form I to F IV. In 2011 it started to enroll F V students.

1.2 Statement of the Problem

The Secondary education in Zanzibar is provided free in all public schools, no student would be deprived of accessing to basic education, either of inability to pay school fees, racial, religious or by other reason. Under normal circumstance, these schools should be the preference of the society sharing the benefit of the national cake for their children to acquire knowledge and skills. However, many people reflection on the public schools as dreadful spots of learning, thus many parents especial with affluent take away their children from public to private schools with higher assurance for quality and efficient learning.

Probably, there are many aspects and specific grounds behind preference to Private schools in Zanzibar. For the time being a number of private schools have been introduced into the educational system of Zanzibar and many people make use accordingly. In other side Public schools are therefore ineffectual approach for students to acquire an adequate amount of knowledge. In view of this situation, researcher started by analyzing the Private secondary schools specifically in the aspects of quality education with reference of four schools.

In conducting the study the following related questions were set to help the researcher to test the hypothesis and making analysis on the Quality Assurance in Private Secondary School in Zanzibar:

- 1) What the key aspects accounting for quality education in Private Secondary schools?
- 2) What is the mechanism of Quality Assurance of Private Secondary School system in Zanzibar?
- 3) What the possible changes are necessary in the provision of Quality Education in Private Secondary School in Zanzibar?

1.3 Objectives of the Study

In reflection to the statement of the problem, the main purpose of this study is to explore the Quality Assurance in Private Secondary School in Zanzibar: Therefore the following specific objectives were developed supporting the researcher to accomplish the main purpose of this study:

- 1) To identify the key aspects accounting for quality education offered in Private Secondary schools.
- 2) To examine the overall Quality Assurance mechanisms of Private Secondary School system in Zanzibar.
- 3) To propose the possible changes which are necessary in the provision of Quality Education.

1.4 Significance of the study

The researcher was able to expose the substantial phenomenon to Private Secondary School whereby the key aspects that enclosed to mechanism were analyzed and finally possible measures were put forward. Provision of quality education by private school has changed the mind of many parents and other education stakeholders, that's why it become the first choice by many elites for their children to acquire sufficient knowledge and skills that appealing to the labor market upon the completion of their studies.

Over this study, there is an open spot to the Quality Education, as far as a good start to warfare on mechanism and approaches of teaching and learning in Private Secondary Schools. Therefore this study is helpful to the researcher himself, not only being the requirement for IM.ED.ELP offered by ECNU but also will widen knowledge that will enable him to participate in education policy development.

Also it is helpful to the future researchers in developing their studies ahead on Education and major issues in Private school, in the matter of administering and managing the quality of education. While the low quality of government schools is cited as the main reason for the mushrooming of private schools (Rose, 2002). Other factors also concern to parent preference to private schools, Parents cite teacher absenteeism in public schools as their main reason for choosing private ones (UNDP, 2003). Therefore, researcher got the opportunity to explore and open the discourse in quality concerns for parents revolved primarily around the availability, competencies, and responsiveness of teachers.

Moreover, education policy makers and stakeholders will get more details from this study so as to facilitate the education development in Zanzibar toward expanding access to education, and to enhance national technical capacity to analyze, diagnose, improve and monitor the quality of the general education systems.

1.5 Definitions of the key terms

Quality: a concept of Quality varies, its real meaning depends to the context used, and however IIEP (2006) has identified ten definitions of quality: providing excellence, being exceptional, providing value for money, conforming to specifications, getting things right the first time, meeting customers' needs, having

zero defects, providing added value, exhibiting fitness of purpose, and exhibiting fitness for purpose. In the perspective of this study quality was delineated at the heart of education, and what takes place in classrooms and other learning environments, is fundamentally important to the future well-being of learners. Some of the input variables, which indicate the quality of Secondary education, are characteristics of the teacher, which include teacher effectiveness, availability and condition of school buildings and educational material, school and education administration.

Quality Assurance Mechanisms: refers to the systematic activities implemented in the provision of quality education so that quality requirements for education will be fulfilled. Two types of quality assurance: Internal quality assurance ensures that an institution or programme has policies and mechanisms in place to make sure that it is meeting its own objectives and standards. External quality assurance is performed by an organization external to the institution. (Sanyal B. C. & Martin M, (2007)). In the context of this paper, the priority was given to the internal quality assurance in which school management put effort to assure quality in learning and teaching, this includes rules and regulation, education facilities, school supervision and support to teacher as well as upholding students' enrolment and discipline in school time.

Quality Education: Barker (1994) defines quality education as all those processes of learning which enable a person to acquire the skills, behaviors, knowledge, values and norms which are considered necessary to live a happy and successful life in the society. In this study, quality education was taken to mean methodological training and instruction which result in the acquisition of relevant knowledge and abilities as well as development of character and mental power, for the benefit of an individual and the society as a whole. Quality education includes:-

- Content that is reflected in relevant curricula and materials.
- Supportive School leadership and supervision.
- Qualified and effective teachers.
- Students who are healthy, well-nourished and ready to participate and learn.
- Methodology through which teachers use child-centered teaching approaches.
- Outcomes that encompass knowledge, skills and attitudes, and are linked to national goals.

Literature Review

This part present empirical reviews from various studies which have done concerning the aspect of private schools to quality education and assurance mechanism in to teaching and learning based on school supervision and management.

2.1 The hasty Private schooling expansion in developing countries

UIS data from 44 developing countries have shown substantial (at least 50%) increases in non-state school enrolments since 1991, as compared to 24 countries with similar percentage increases in government school enrolments (UIS, *ibid*). There are more than 113 million children enrolled in non-state schools in developing nations in which 51 million are in secondary school (approximately 24% of the total). Indeed, South Asia approximately 39%, and in particular India, Bangladesh and Pakistan, have the highest numbers of private school enrolments (Andrabi, 2006).

Figure 2. 1 substantial growths in enrolments in private and state provision across various regions

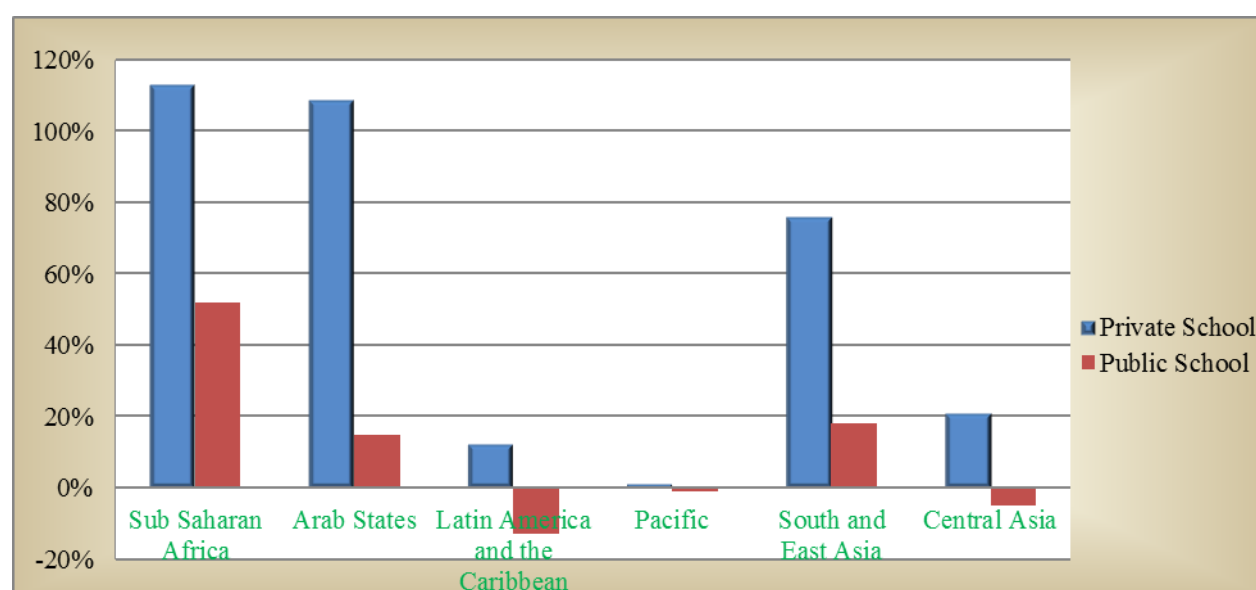


Chart based on UIS statistics from 1991 and 2003.

In short, there has been tremendous recent growth of private schools around the world. And, while it is possible that some of the baseline numbers are low due to undercounting or failure to include private sector schools in surveys, the upward trend in non-state provision is unmistakable. The countries with the highest private enrolments at secondary level are Bangladesh (96%) and Zimbabwe (71%) (UIS, 2003).

2.2 Quality education by effective school leadership

The provision of Quality education is the consequences from the collaborative endeavors by parents, schools, Ministry officials, international agencies. The World Bank (Heneveld and Craig, 1996 highlighted four important contexts: supportive inputs from outside the school, enabling conditions, school climate and teaching and learning processes in the school. A study in Ghana (EFA, 2005) has shown that an effective approach to school improvement is one that sees the whole school as the locus of change: whole school development (WSD). The most important question for private school in Zanzibar is ‘what are the systems, procedures, structures and competencies that need to be in place for head teachers to be able to lead learning

effectively in their schools?’ There are individual, inspirational, charismatic head teachers to be found in Zanzibar and in every education system.

2.3 How Quality Education in Private Schools differ from Public?

There is a widespread assumption in some quarters that non-state schools provide a level of quality which is worse than state schools. Rose (2002) finds mixed results across different countries: the PROBE Report in India suggests higher quality of education in private schools. Checchi and Jappelli (2007) urge that students and their families are of course highly heterogeneous along a variety of dimensions, and public and private also differ in important respects highlighted by several other recent studies of Italian evidence. The following table reports the answer to reasons for choosing private schools in a sample of 20,153 households interviewed in June 1998.

Table 2.2 Fraction of students enrolled in private schools by parents’ choice – Italy

	Primary	Lower secondary	Upper secondary	Total
No specific reason	11.3	11.6	6.1	9.8
No choice (only school available)	7.6	4.8	27.4	12.7
Vicinity	14.8	12.8	11.7	13.5
Services offered	48.9	41.5	26.1	40.8
Cultural (ideological) reasons	14.0	13.4	13.5	13.7
Quality of teaching	36.8	43.4	39.4	38.9
Other reasons	9.5	12.5	5.8	9.9

Source: ISTAT, 2000,

Using the same dataset, Brunello and Checchi (2005) show that students enrolled private schools are significantly more likely to use expensive individual private tutoring, and characterize their background and aspirations using the PISA 2000 survey data: among other factors, private schooling is motivated by better standards of education as well as by parents who are busy enough to appreciate not having to help their children with homework.

2.4 What make Private Schools More Efficient?

A number of recent studies find that students perform better in private schools as found by (Moe, 2000; Cookson, 1994; Digest of Education Statistics, 2002). The findings that private schools are less efficient differs from those reported elsewhere for Tanzania based on data from an earlier period when private schools were

relatively rare ([Lassibille](#) & [Tan](#), 2003). The studies in Bangladesh depict that at the primary level, NGO schools are widely considered to be more effective than government, other non-government, or madrasa schools.

Table 2.3 Proportion of children aged 11-12 years achieving basic learning competency by type of school in Bangladesh

Type of School	Girls	Boys	Total
Gov't Primary	18.9	24.2	21.5
Non-Gov't Primary	19.9	27.1	23.5
Non-formal	34.5	44.0	38.3
Ebtedai Madrasas	12.1	18.1	15.2
All School Types	27.9	31.3	29.6

UNESCO - Education for All Global Monitoring Report 2008.

Even though the Data for the overall average annual increase in school fees for private schools in Tanzania is not available. However, **Mshomba (2001) urges that** anecdotal evidence leads to assume that school fees have been increasing faster than the overall inflation in Tanzania.

2.5 Limitation of the Previous Studies

There are some knowledge gaps that failed to fulfill the current world requirements on private schooling in the context of quality education. Among the limitations I found is about conflicting evidence on whether private schools students actually make more academic progress than public school students. Several reasons make such analyses difficult to conduct and ultimately inconclusive. One reason is that even if students in the studies come from disadvantaged backgrounds and do well in private schools, it is impossible to know if their academic success is a direct result of private school practices. It could be that other factors, such as parent involvement or student motivation. Another reason is that it is hard to tell whether achievement differences between private and public school students would remain if more students were to attend private schools. One more reason; comparing private and public schools is not as straightforward as it may seem. Within both types of schools, there is a great deal of variation.

Research Methodology

This chapter gives details on the process how research was conducted as well as the methods and techniques that were employed in the process, analysis and interpretation of data.

3.1 Research design

The design for this study were both qualitative and quantitative method because of the suitability nature of the study. The Qualitative research design was applied in methods and techniques in which the research was conducted in the natural settings of private and public secondary schools, in which the meanings were derived from the research, are specific to that setting and its conditions. A case study was used in order to examine the provision of Quality education in private schools acutely with comparison to public secondary schools.

On the other hand, Quantitative approach which uses numerical values and categorical scales were employed to complement the qualitative approach. Thus, the key issues and quality assurances in four schools were deeply examined through the primary data from the respondents in these schools of the case study and MoEVT. Besides, the quantitative methods and techniques like desktop review technique or documentary search review were mostly used to capture relevant secondary data to endow with more answers to the research questions in advance to the key aspects and how they are smoothly organized and facilitated in secondary schools of Zanzibar.

Therefore the two mixed approaches were better whereby the data were expressed in numbers, tables and graphs along with enough words expressions that provided analytical classes of data collected to discern and explicated principles that granted the answers to the research questions in to collection. Qualitative and quantitative designs enabled the researcher to examine the relationship among the dependent and independent variables like curriculum, teaching and learning approaches, mechanism, teachers and students etc.

3.2 Description of the study area

The selected area for this study is Zanzibar that comprises two major islands of Unguja and [Pemba](#), together consisting more than 50 small isles. While the case study was drawn from four schools to determine the degree of the problem profoundly, in which two schools are Private and other two from public schools, all these schools are located at Unguja Island.

Figure 3. 1 A map of Zanzibar showing the two major islands of Unguja and Pemba where the study was conducted.



SOURCE: Zanzibar Irrigation Master Plan: Action Plan Report, Vol 1, 2003

3.3 Target Population

The target population for this study was drawn instantly from four schools of case study. These are leaders of schools including principals, academic officers and administrative officers so as to examine the management means applied to assure quality education in their schools. Also teachers and students of these schools were used to assist the researcher to identify the key aspects for quality education, and to measure the management mechanism used to facilitate the key aspects for quality education. At last the Ministerial Officers were involved to share their experiences to education matters specifically to quality education on account of secondary level.

3.4. Sample and Sampling Techniques

3.4.1 Sample

Four Ministerial Officers were used to share their experience on the means applied by the Ministry of Education as an external quality assurance organ which includes the orderly activities, monitoring and supervision in to teaching and learning in schools in order to verify whether they meet the encoded standards. Other samples drawn from four schools of the case study which are 12 administrators. Also 72 teachers from four selected schools with 18 of each school were used as samples. In this study also 48 students from four selected schools with 12 of each school of the case study were drawn to provide their compliments to the extent of quality education offered in their school next to school management supervision and development in school environment and teachers ability. Therefore total number of 136 were used in this study so as to test the hypothesis and find out the details of the research questions.

Table3. 1 Sample Composition by Category and Schools

Types	Target	Reached	Unreached	Analysed
Ministerial Officers	4	4	-	4
Head Teachers	12	8	4	8
School teachers	72	48	24	48
Students	48	47	1	47
Total	136	107	29	102

Source: computed from collected data 2012

3.4.2 Sampling Techniques

There was a limitation of time and resources and for that reasons two basic sampling methods were involved; probability and non-probability sampling. Non-probability with purposeful sampling technique used to select the schools for case study. In these schools the researcher selected information rich-cases that provide inputs for in-depth analysis of issues related to the quality education. Also this method was applied to select four officers from ministry of education. They provided their experiences and what mechanism the Ministry of Education has done to assure the Quality of education in schools. Also schools leaders were drawn in purposeful sampling according to what is conveniently to provide the overall management approaches applied to quality education.

Another approach was the probability method in which a stratified random sampling used to select students and teachers from the schools of a case study. Stratified random sampling that researcher divided the population of students and teachers separately into strata of 6 Grades from Form I to Form VI separately, where by every student and teacher from each strata (grade) among 6 Grades had an equal chance of selection to give out the details on the scope of quality education. Finally the researcher got 47 students and 48 teachers who were used as samples of the population.

3.5 Data collection

For data collection, both primary and secondary source were used. By primary source the data collected from target population and for Secondary source, the data were collected from different cast-off sources and documents related to study.

3.5.1 Documentary review

This study made use of methods of published statistics and unpublished documents. These documents are assessed against authenticity, credibility, representativeness and meaning. The researcher therefore, used documentary search reviews such as academic work [dissertations], journals, government publications, policy documents, books, newspapers and Zanzibar government sources like Education Policy 2006, academic reports etc.

3.5.2 Questionnaires

The different questions were structured related to the research questions. The questions were mixed, close-ended and open-ended so as to allow primary source informants to provide their different views on the raised issue. Thus, 48 questionnaires were distributed to students of four schools with 12 students of each school. Also 72 questionnaires distributed to 72 teachers of four schools, 18 questionnaires to the teachers of each four schools.

3.5.3 Interview

For this study the interview was applied to the 12 leaders of four schools where by every school involved three leaders. Also the interview technique was used to select officers from ministry of education to make possible for a researcher to get an in-depth understanding of the matter at hand as it allows probing. The Semi-structured interview employed where the researcher expected to cover every question in the protocol and have some wiggle room to explore participant responses by asking for clarification or additional information.

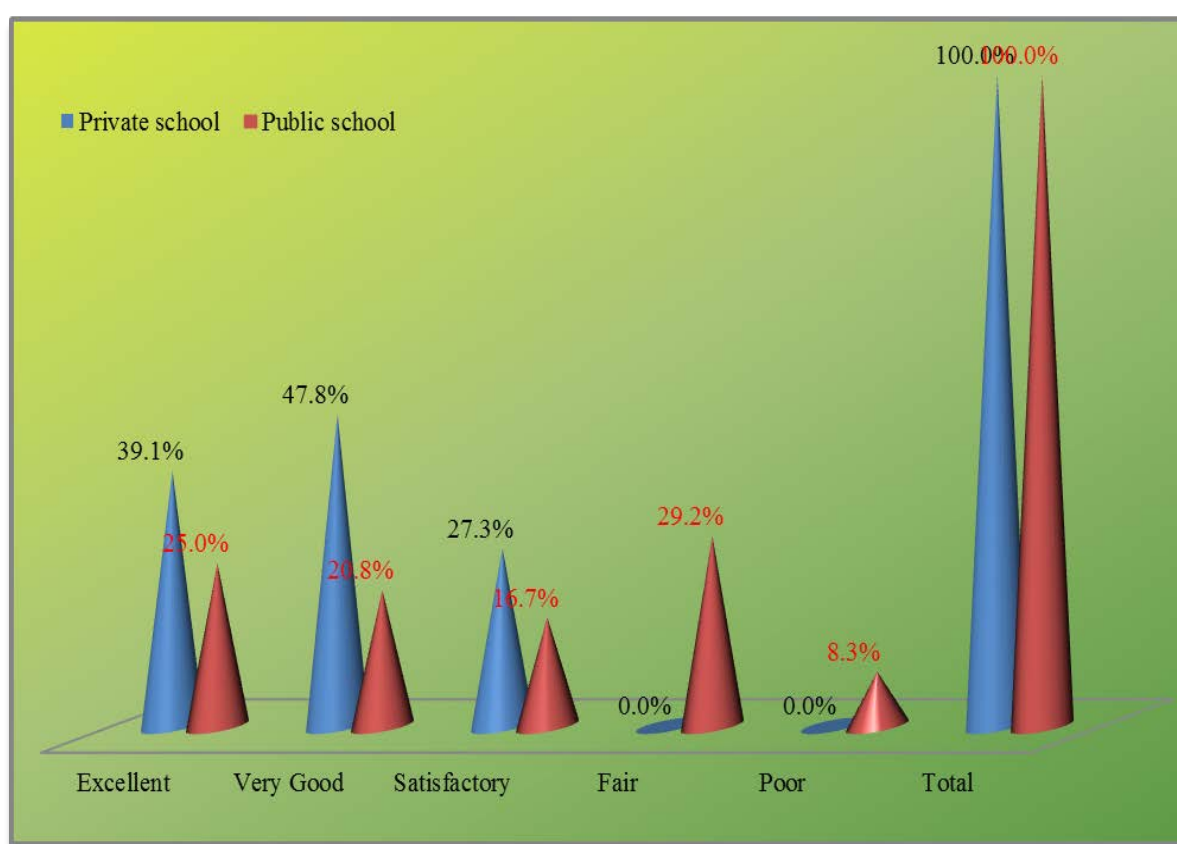
Data Presentation and Interpretation

This chapter dealt with presentation and interpretation of the findings. The data on this chapter are presented with deeply interpretation and then built in discussion based on the research questions used during the data collection.

4.1 Overall views on quality distinctions in Private from Public secondary school.

This study intended to present the real situation concerning the quality education in private secondary school comparing to public schools. In actual fact, the results obtained varied between these three momentous groups (head teachers, students and teachers). However the outstanding difference is remarkably well in private schools than Public, for students 39.13% of private school believed the quality is excellent while 25.00% public school students who thought in the same degree, other highest value was 47.83% of private school students indicated the quality is very good comparing to 20.83% public school students. This result depicts the certainty from the students' views in Private school to agree the quality of education is better than in public secondary schools as specified in the following Figure 4.1.

Figure 4. 1 Students' opinions on quality education



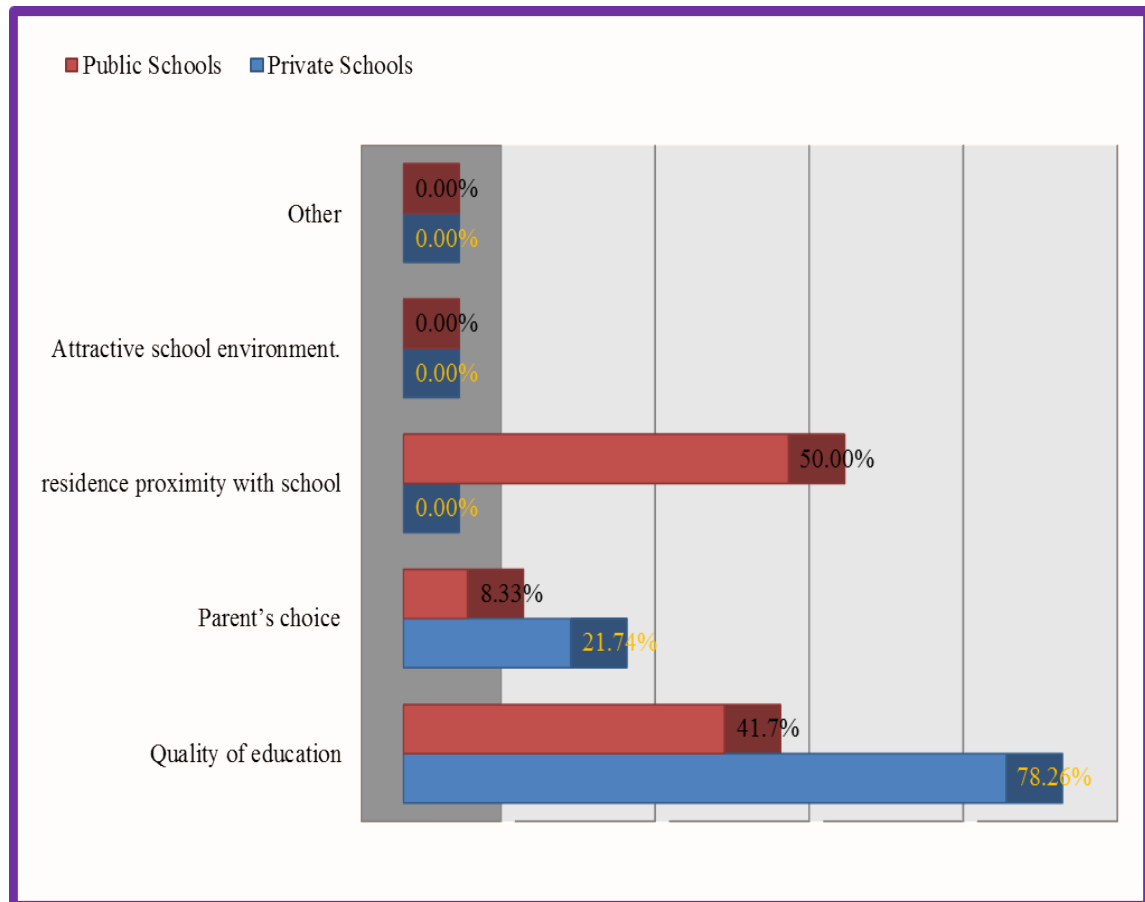
Source: computed from collected data 2013

In computing the results from students, teachers and administrators the end results indicated that private secondary schools offer higher quality of education than public schools. Yet the quality in public school is there for some extent by 36.36% and 20.41% satisfactory and fair respectively and noticed to be poor for 1.89%, while in private schools no views that indicated poor quality.

4.2 Quality education a key generating students' enrollment demands.

This study also sought to how quality of education is impressive to student getting enrolled in particular schools. Through this category of attraction there a range of views obtained from public and private school, for private school 78.26% of students are enrolled because of Quality of education offered. In the counterpart 50.00% of public school students have been enrolled because of their residence proximity to the school, other 41.67% because of Quality of education provided in the school.

Figure 4. 2 Fraction of Students Enrolled in Private and Public Secondary School by Different Reasons



Source: computed from collected data 2013

From the above figure illustrated the quality education as the major attraction for generating demand of students enrollment in private secondary school, many students 78.26% in Private school are enrolled for assure of quality teaching and learning. They were turned out to be student in these schools by choice rather than by chance and they are learning for assure that the education offered is appealing to their future labor market or further learning upon completion their studies. Contrary to public schools where by high number of students 50.00% are enrolled in particular schools for Geographical proximity, due to the government policy that the enrollment is done under residence proximity to the public schools so that can reduce high number of students in some schools.

4.3 The key aspects accounting for quality education in Private Secondary schools.

This study also sought to identify the key aspects accounting for quality education offered in private secondary schools, the questions developed to meet this objective were asked to Students and teachers as well as school administrators and other additional information collected from secondary data. Ministerial officers mentioned; Media of instruction which are English and Kiswahili, teaching and learning materials, effective and qualified Teachers, Teaching methodology, school management, attractive school environment, as well as number of students who pass the national exams. So far this study also sought the degree to which the aspects of quality education are facilitated in Private secondary school comparing to Public school as the following table 4.2 below shows the total results that in private schools is ideal set more willingly than in public schools;

Key aspects	Private schools					Public schools				
	Excellent	Very Good	Satisfactory	Fair	Poor (Low)	Excellent	Very Good	Satisfactory	Fair	Poor (Low)
Relevant curriculum that provides knowledge and positive attitudes to the students and efficient learning outcomes.	20.8%	45.3%	9.4%	18.9%	5.7%	8.2%	38.8%	17.0%	16.3%	22.5%
Teacher working condition that encompass Satisfactory payment and career development.	0.0%	50.0%	25.0%	0.0%	25.0%	0.0%	75.0%	0.0%	0.0%	25.0%
Examinations as effective assurance mechanisms for learning that can reinforce the objectives of education.	32.1%	32.1%	24.5%	15.1%	3.8%	10.2%	22.5%	30.2%	30.6%	12.2%
Availability of relevant Teaching/Learning Materials to teachers and learners.	17.0%	35.9%	22.6%	20.8%	5.7%	6.1%	17.0%	20.4%	36.7%	20.4%
Qualified and effective teachers with a wide subject and pedagogic knowledge for improving students' performance.	25.00%	25.00%	25.00%	25.00%	0.00%	25.00%	50.00%	25.00%	0.00%	0.00%
School Laboratories and Libraries as essential components for enhancing teaching and reducing rote learning.	26.4%	22.6%	17.0%	22.6%	5.7%	3.7%	14.3%	16.3%	22.5%	49.0%
Teacher's ability to teach at the students' level and to use various teaching facilities for class facilitation.	0.0%	50.0%	0.0%	0.0%	50.0%	0.0%	25.0%	25.0%	0.0%	50.0%

ICT application for effective teaching and learning, and enhance curriculum implementation.	9.4%	9.4%	24.5%	18.9%	37.7%	3.7%	8.2%	12.2%	14.3%	65.3%
Language of Instruction and Options as the vehicle through which knowledge is internalized.	15.1%	43.4%	18.9%	18.9%	3.8%	4.1%	17.0%	17.0%	26.4%	30.2%
Culture with programmes that endorse student to respect local communities and their prevalent cultures	10.0%	40.0%	20.0%	30.0%	0.0%	0.0%	23.1%	26.9%	46.2%	3.9%

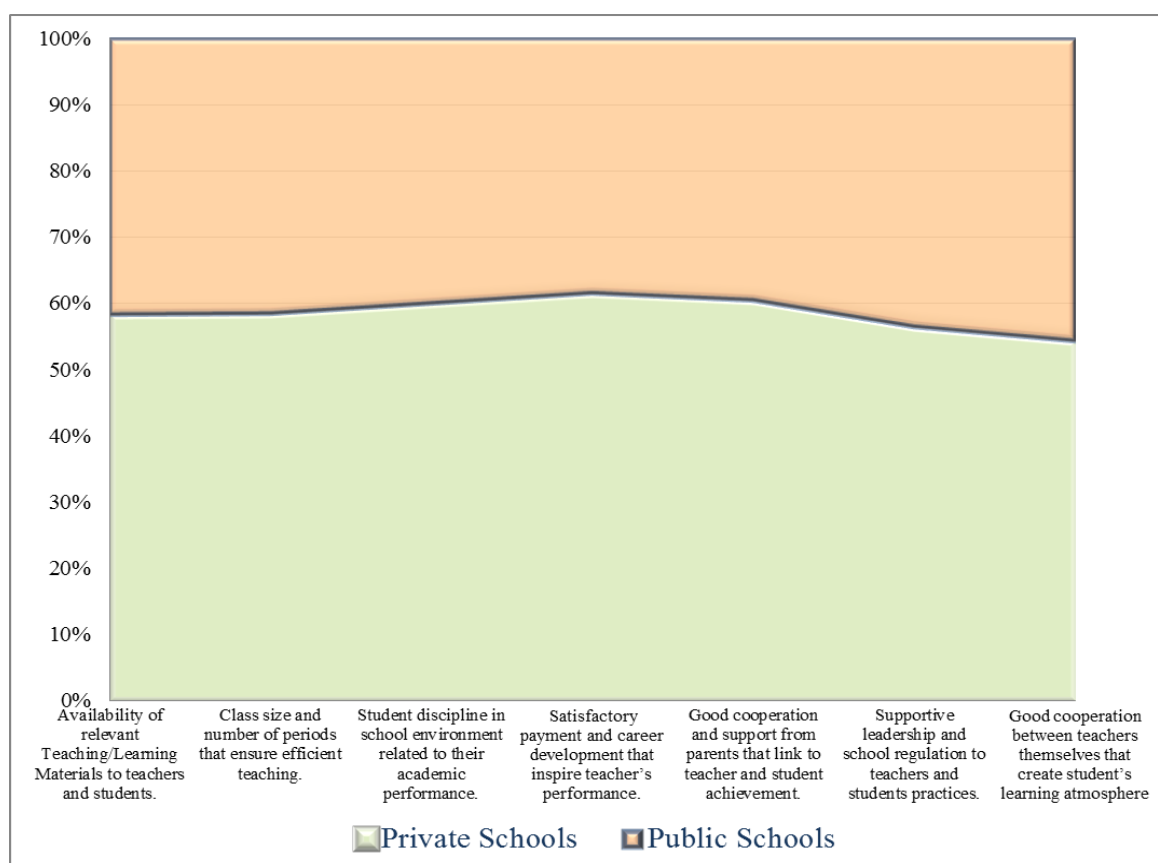
Table 4. 1 The extent to key aspects for quality education facilitated in private and public secondary schools.

Source: computed from collected data 2013

4.3.1 Teacher working condition to quality education.

Teacher willingness and preference to their work typically smooth the progress of school and make possible to the students to meet their needs in learning. In this study teachers were asked how they are pleased to work with such condition, there is a variety of indicators used to measure the acceptance of the teachers; almost 60% are private school teachers who are willing to work in the current condition of their schools, while nearly 40% Public school teachers whose positive reflection working condition in their schools. According to other studies (VSO, 2011) cited that in public schools there was unanimity among teachers and head teachers about the need to raise salaries. All teachers feel an increase in salary would have a direct and immediate impact on their motivation.

Figure 4. 3 Teacher s' acceptance to their working condition by different aspects.



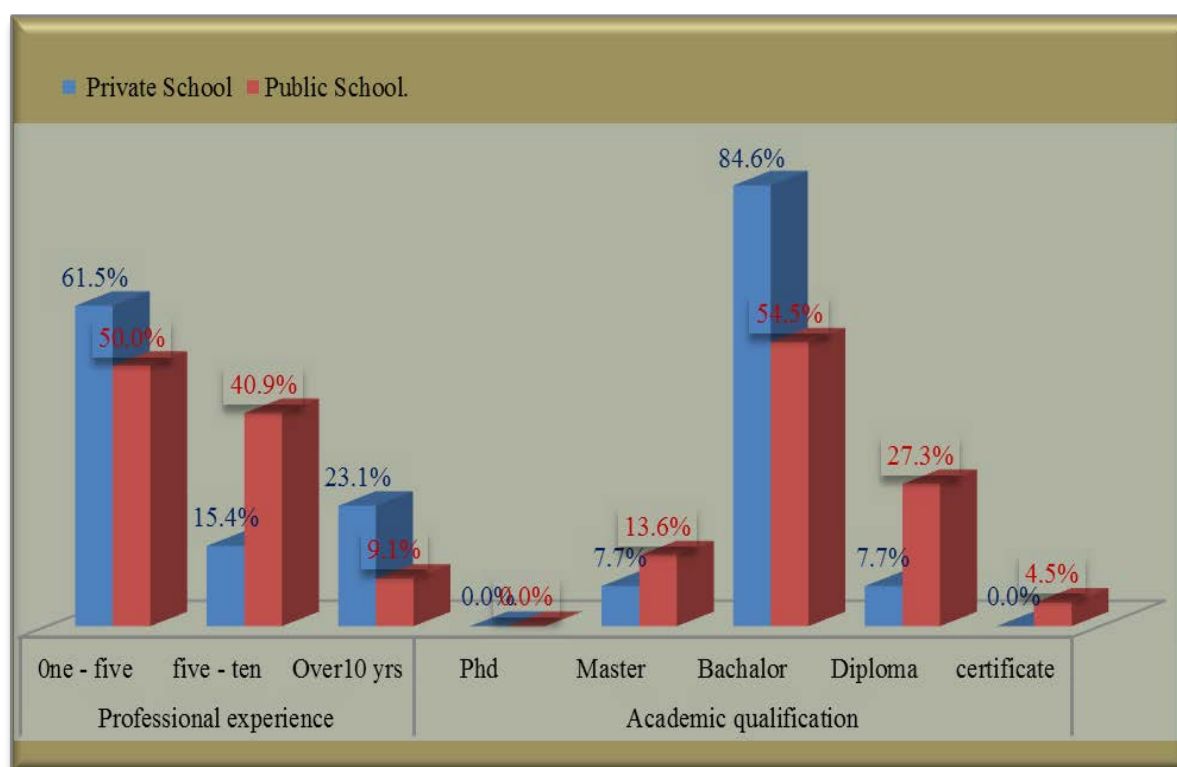
Source: computed from collected data 2013

4.3.2 Qualified and effective teachers

At secondary level current policies require that teachers with a diploma level qualification teach only up to Form 2. For Form 3 to Form 6 teachers should have degree level qualifications. Currently close to 50 % of public secondary teachers are unqualified, 40 %

have a diploma and only 11% have a degree or higher (VSO, 2011). This study found the interesting results on professional development to private secondary school teachers where most of them are qualified to teach at secondary level, with 84.6% degree holders following with diploma 27.3% and teachers 7.7 of master degree qualification, that to say the Private secondary schools have met the government policies on qualified teachers. On the other hand, 54.5% public teachers have bachelors following with diploma 27.3% and master degree 13.6%. What is dull to public secondary schools when there are some unqualified teachers 4.5 % with certificate qualification who teach secondary level which is contrasting to the government policy. About professional experience the result Figure 4.4 that for most part of private secondary school teachers 61.5% are merely with experience in teaching for 1- 5 years, this indicates that nearly every private school employ young teachers whom have just graduated from the university for their qualification rather than experience;

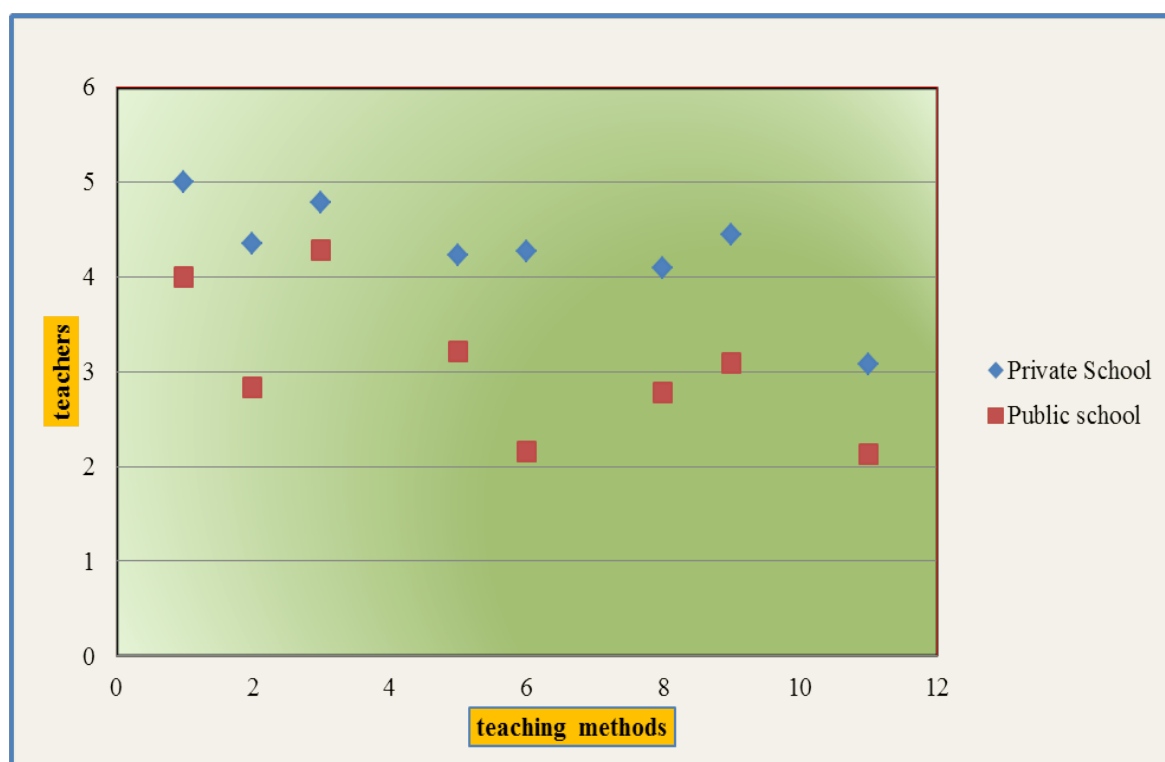
Figure 4. 4 Teachers' professional experience and academic qualification



Source: computed from collected data 2013

The findings that (figure 4.6) revealed the successful Private secondary school teaching methods as indicators to qualified and effective teachers in the provision of quality education, for which students 43.48% and 52.17% in private school specified teachers are able to teach at students' level, are clear and comprehensible in teaching which is greater notable than 20.83% and 20.83% in Public secondary schools. Other items that were examined in the aspects of effective teaching and found so typical applied more in Private secondary schools.

Figure 4. 5 The effective teaching methods



Source: computed from collected data 2013

There are some factors that should be also put under consideration for this dissimilarities, the lack of qualification or subject knowledge presents teachers with difficulties in understanding and breaking down the curriculum for their students. In such particular manner that mostly happens in many Public schools students are not expected to ask questions and the teacher's knowledge is not tested.

4.4 Ministerial mechanisms in to school Supervision and support

About quality assurance mechanism employed by Ministry of education is supervision (inspection/follow-up) and support (advice/mentoring) in to teaching and learning to school management and teachers. There is special unity for evaluation and follow up to the schools to assure quality teaching and learning. This mechanism has to ensure clear and transparent systems and procedures for monitoring teaching and learning. However, the finding (MoEVT and ZEDCO, 2007) identified that several actors are intervening without much coordination: Inspectors, District Officers, TC Staff, Head Teachers and School Committees.

4.5 School leadership and supervision

The role of school management is to ensure that raising the quality of teaching and learning in the classrooms is central to all activities in school, in the public schools the school heads were

appointed as associate inspectors in order to make them more accountable, while private school each school has its own approaches treating the quality of education. Private school leadership tends to be so creative to build conducive school environment for better achievement, as one Private school administrator described:

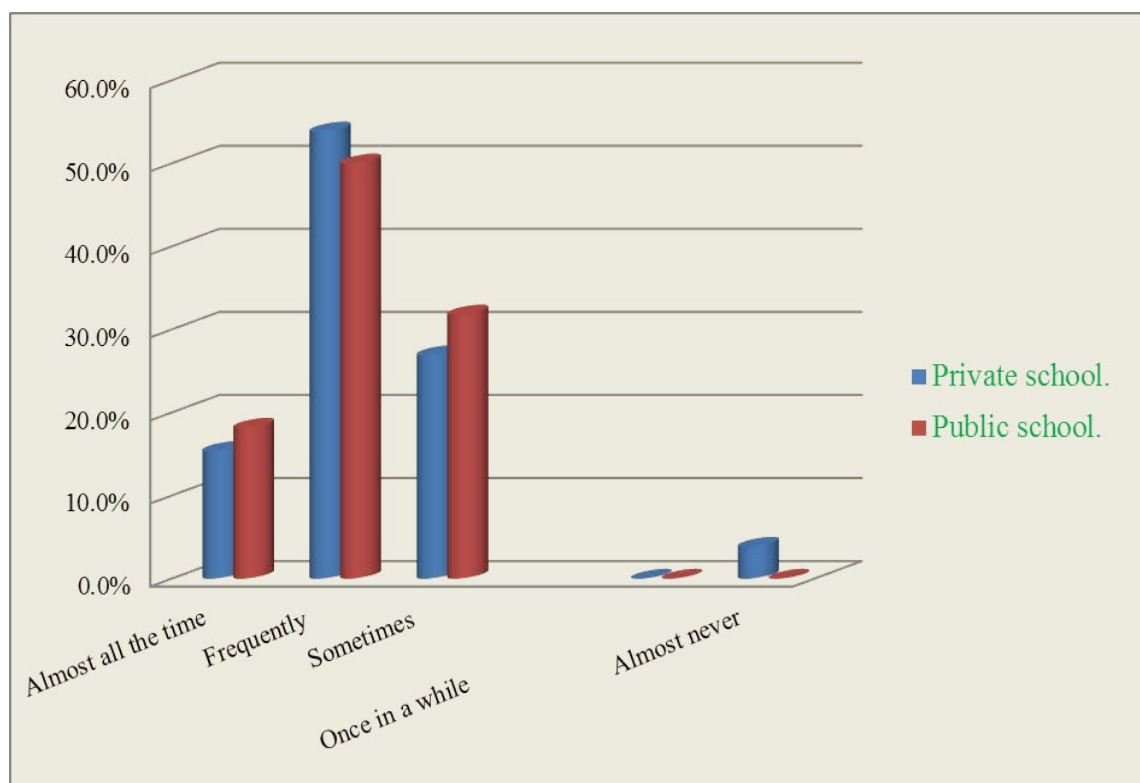
“We endeavor to keep good orders for teachers and students to ensure advanced school achievement, we organize workshops and in-service training for teachers, and we have special subject of sports for students to develop inspiration of learning more”.

These mechanisms also include in-service training and workshop for teachers which help them to provide proper teaching to students. Other mechanisms includes extra curriculum activities, introducing the Interaction with teaching /learning materials, student learning by doing. Conversely, some (25%) public school managements come to nothing with any program or policies for reliance to MoEVT.

4.6 Mutual understanding for school achievement

Good cooperation in the School environment is too sensitive to realization of better education provided in the schools. This study found that almost all schools specified the same cooperation, except good cooperation with parents is seem lower in Public schools 17.00% than in private 26%. Supportive school leadership to teacher is well remarkably more at 26% Private school than 20.00% public secondary schools.

Figure 4. 6 The interactions between School teachers and students during the class and school environment.

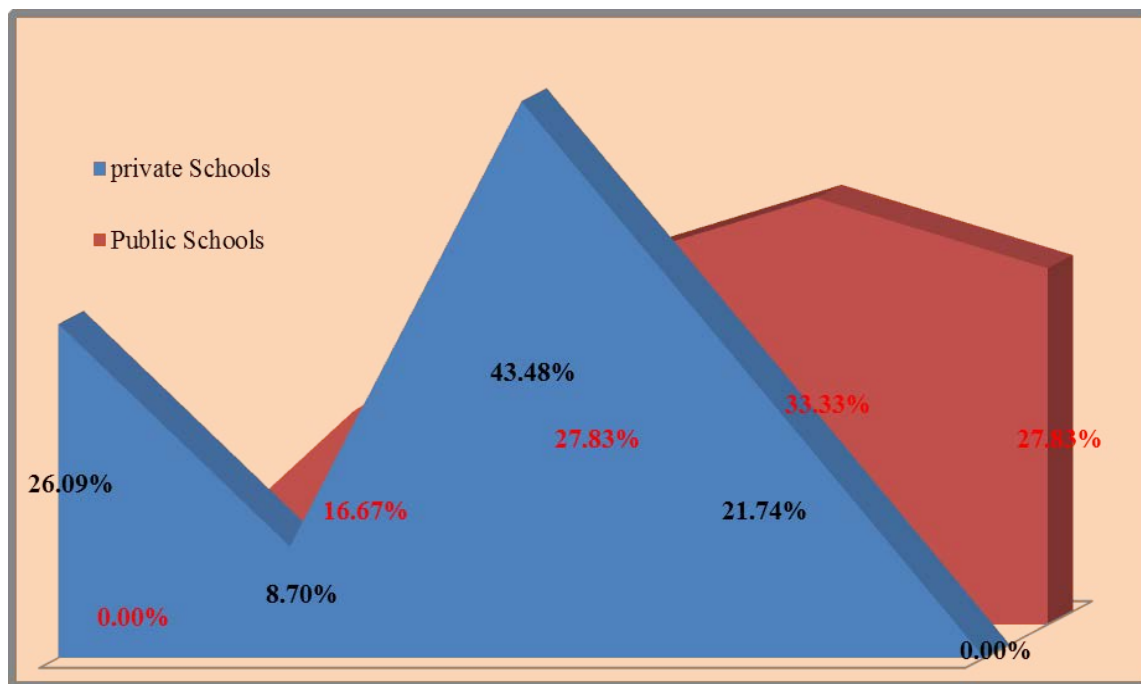


Source: computed from collected data 2013

Through this figure clearly show that the interaction between students and teachers in private and public school noticed with small distinctions, Public school teachers 18.18% are Almost all the time have conversations with students for 15.38% private schools teachers. However some Private school teachers 3.85% they almost never communicated with their students.

The same results obtained through interaction of school management to other momentous groups (i.e teachers, students, Parents) for school development, 50.0% private schools are extremely positive comparing to public school 25.0%.

Figure 4. 7 A sense of mutual understanding between School Management and Students.



Source: computed from collected data 2013

The achievement of private secondary school in the provision of quality education can be measured with different aspect as explained in the key aspects of quality education, however ministry of education set the standards in to induction and assessment to the school so that can attain the standards based on teaching and learning modes, through the interview the ministerial officer described that private school have good records on students and teachers performance while Public schools have realized little number of passed students in national examination because of low commitment and shortage of resources.

Discussion, Conclusion and Recommendation

This is the last chapter in this study that dealt with Discussion of the major findings, conclusion finally recommendations that put forward to abridge gap of necessary changes in the provision of quality education.

5.1 Specifications to Private secondary school with Quality education.

The study verified the peculiarity of Private secondary schools in the provision of quality education that is derived from its independence in economic and leadership, which to large extent enable to better facilitate school infrastructures, teaching and learning materials for 17.0% and 35.9% as well as creating teacher atmosphere to their works and students are aware to reasonable learning in school environment. Each private school has its own mode of teaching, learning and management which catch the attention of many parents especial with affluent to enroll their children to fit with school attractive learning. Because of the better school leaning atmosphere, it found Private schools may attracts students for educational quality 78.26%, and ideology that all play a role in generating demand for private education.

5.2 Discussion on key aspects for quality education

Based on the key aspects for quality education, the findings revealed the teaching and learning environment in private schools is ideal set more willingly than in public schools. The notable difference between public (84%) and private schools (94%) in the provision of three basic learning materials. A Global Campaign for Education position paper (GCE UK, 2008:3) talks about 'accessible learning environments', which include the curriculum, learning and teaching materials, and the built environment. The key aspects including Learning and teaching facilities with ICT application are well notably in Private secondary school than public schools. Many private schools tend to have better facilities 70.4% but these are often offset against the difficulty of expansion. Further to this, (MoEVT & VSO, 2011) noted in many public secondary schools are housed in what were previously primary schools, so there are few specialist laboratories or libraries.

5.3 Discussion on Quality Assurance mechanisms in Private secondary schools

There are different mechanisms employed by school managements to assure quality education. The independence that have many private schools with autonomous to decide on what amount to charge for fees for students enrolled in the schools has realized the better progress in learning and teaching. Over time, that would reduce the rate of increase in the demand for private education. If most public schools were of the quality of private Secondary School, for example, most people would try to get their children into public schools. Ministry of education has employed mechanism of monitoring and Evaluation enables one to access the quality and impact of work, against action plan and strategic plan. In order for monitoring and evaluation to be really valuable, one needs to have a well-planned course of action

(Shapiro, 2001). There is need to have a wider public involvement in all these processes from formulation to implementation.

5.4 Conclusions

The data which presented and discussed based on three research questions gave a clear picture about quality and efficiency in Private secondary school compared to public schools in Zanzibar. There were different views obtained concerning the quality teaching and learning that realize better school achievement, the data were collected from four schools that indicates the learning impression and school management efforts to maintain quality in private secondary schools. It is possible to draw some general principles that provide a useful context for thinking about quality education and the role of school autonomy as principal agents for change. While the poor conditions in public schools drive the parents in Zanzibar to resort to private schools (78.3%) so as to achieve quality results for their children. But this widens the manifestations of the gap between the rich elite and the poor. The poor cannot afford the extra educational expenses and costs in private school for quality education.

5.5 Recommendations

It was universally agreed by those whom the researcher talked to that the quality of education in Zanzibar needs to improve. This study proposes the following possible changes:

- Zanzibar needs to have an effectively structured and funded mechanism for carrying out intensive monitoring and evaluation from the early stage of teaching and learning. This can help in obtaining technical information so as to identify and address challenges for excellent results.
- Considering the supply side, the government should streamline procedures for opening and running private schools and make them completely transparent.
- Government should also accountable to private secondary school in the sense treating them the same as public schools and provide them with opportunity for carrier study in the teaching profession.
- Since private schools are working autonomous, therefore, training in schools becomes more important, as does the functioning of structures within the schools, such as panels, to carry this out.
- School managements needs to have frequently checking of their policies and conducts to the school, enrollment procedure with consideration to equity and efficiency education as well as discipline in schools environment.
- Good cooperation is a key to success; school management should be personalized with flexibility, democracy, commitment, accountability and transparency to teachers, students and parents.

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Key inputs, processes and outcomes identified by participants in the provision of quality education (MoEVT & VSO, 2011)

Inputs	Processes	Outcomes
Teaching and learning materials: <ul style="list-style-type: none"> • textbooks • science equipment 	Good teaching methodologies: <ul style="list-style-type: none"> • varied approaches to teaching • good planning • good lesson structure • evaluation 	Exams: <ul style="list-style-type: none"> • good results
Conducive teaching environment: <ul style="list-style-type: none"> • enough classrooms • sufficient classroom equipment • a clean and safe environment 	Good student participation: <ul style="list-style-type: none"> • group work • questions • discussions 	Knowledge: <ul style="list-style-type: none"> • subject knowledge • English
Class size: <ul style="list-style-type: none"> • smaller classes (30–45 students per class) 	Assessments and follow up: <ul style="list-style-type: none"> • monitoring and evaluation by teachers • monitoring and evaluation by head teachers 	Improving life and life chances: <ul style="list-style-type: none"> • vocational skills • employment • lifelong learning
Teachers: <ul style="list-style-type: none"> • qualified, competent and motivated teachers • enough teachers qualified in the subjects they teach • more science and maths teachers • committed teachers • good-quality training 	Curriculum: <ul style="list-style-type: none"> • fitted to the needs of students and society • accessible to students 	Benefiting society: <ul style="list-style-type: none"> • education that fits the needs of society
Teachers' conditions of service: <ul style="list-style-type: none"> • increased salary • better housing 	Teacher support: <ul style="list-style-type: none"> • teachers working as a team • peer coaching • preparing materials together 	

Part VI

Engineering Sciences

Control module for a gas water heater

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ABSTRACT

This paper gives a detailed description of a prototype of control module for a gas water heater. All manipulations over input variables, as well as control of output relays have been handled by the microcontroller Arduino Uno. The module can be controlled using a 4x4 keypad and a Nokia 3110 display, as well as over a network connection. The theoretical part describes the principle of operation of the gas water heater. There are also some topics related to the field of thermodynamics that have been discussed. A two-point controller applied to a thermodynamic system has been described as well. The paper deals with design of the module and with characteristics of hardware components that have been used. A compatible shield has been developed in order to adequately connect components to the microcontroller. The software has been created using the open-source Arduino environment. Besides standard libraries that are part of the environment, some additional libraries have been used: for graphics of the display, as well as for time interrupts. A special library for work with generic functions for reading and writing to EEPROM memory and a function which detects keystrokes have been created. Possibilities for remote control via TCP/IP (using the ethernet shield and Telnet protocol) have been clarified. The microcontroller acts as a server which can be accessed using any available Telnet client software. A Telnet php client has been developed. In combination with a web server available on a LAN network, it opens up numerous possibilities and at the same time it can provide the global Internet access to the control module. Furthermore, the module can be connected to the Internet directly through a router with Internet access.

Key words: Control module, gas water heater, embedded system, Internet controlled device

Introduction

Embedded systems can be found in a wide range of devices today. They are usually designed to perform a specific task. We find them with devices in consumer electronics (mp3 players, portable gaming consoles, home appliances), medical equipment and transportation systems (GPS devices for navigation, control traffic lights, automotive industry), industrial electronics and the like. Development of an embedded system includes parallel design of hardware and software. A wide range of user interfaces are used, from simple push buttons to more complex menus displayed on an LCD. Ordinary microprocessors or microcontrollers with additional peripherals usually have the role of the central processor.

Considering that in the control module for a gas boiler one of the simplest types of control has been implemented (two-position control), in the process of developing and debugging it was enough to use a display for feedback, while the algorithm and module's components were tested piece by piece.

It is an embedded mounting system for temperature control for one room which provides interface for adjusting parameters such as: temperature setpoint, hysteresis, startup time, operation mode (auto/manual), the minimum temperature difference of incoming and outgoing water after the startup (in order to verify the functionality of the burner and circulation pump).

Numerical values have precision of one decimal place after decimal coma. While writing the program, the limited memory resources had to be taken into account, especially when it comes to RAM (only 2 KB of available memory). The goal was to create an easy to use interface, with a clear display of variables and a LAN access. The interface can be integrated into a web scheduling, or an alarm cron service.

1. The principle of operation of the gas boiler

1.1. Boiler

The term refers to closed containers in which liquid is heated under pressure. The fluid does not necessarily boil. Heated fluid, or steam coming from the boiler is used for various purposes. It can be used for space heating, sanitation, cooking or as a generator. In this paper, the term boiler will imply water heaters (used to heat rooms) constructed to circulate heated water (rather than vapor) through pipes. In such boilers water must not warm up to the boiling point, because the presence of steam and excessive temperature in the pipes lead to increased pressure and risk of explosive bursting. Therefore, the temperature must be maintained below the boiling point. Pan is usually made of copper, iron alloy, carbon steel or low-alloy steel, because of low prices, low risk of rupture due to corrosion, good thermal conductivity and low coefficient of thermal expansion. As a source of energy to heat fluids different burning fuels are used, such as: wood, coal, oil and natural gas. Electric water heaters use heating elements that release energy by Joule's law. Boiler's power supply system may include a generator. It could use wind power, hydropower or solar energy.

Since the topic of this paper is a control module for a gas water heater, this chapter describes the basic features of this boiler, structural design, theoretical part related to the heat transfer between different media, a mathematical model of the process of heating and control.

1.2. Gas Water Heater

Classification according to the way of functioning:

- Classic wall-mounted gas boiler
- Condensing gas boiler

In a conventional boiler fuel burns and hot gases pass through the heat exchanger, where most of its heat transfers to water. One of the hot gases produced in the combustion process is water vapor. It's produced by combustion of hydrogen in the fuel. The condensing boiler extracts additional heat from waste gases by condensing the water vapor thus recovering its latent heat of evaporation. The condensate is then used to heat the incoming liquid resulting in increased efficiency of 10-12%.

Classification according to the amount of water:

- Flow heaters
- Storage heaters

Flow heaters have small volume (5, 10 and 15 liters). They must have strong heaters, because the water heats up quickly when flowing through them. The storage heaters are generally of larger volumes (30, 50, 80, 100 and 120 liters), and gradually heat cold water from the tank. Due to its capacity these can have more outlets than flow water heaters. The heated water (typically 60°C, maximum 70°C) is mixed with cold water according to user preferences. The required amount of hot water is one of the basic parameters when choosing a type of boiler. It depends on the number of household members, number of outlets, and a position at which the device can be placed.

Classification according to the purpose:

- Water heater
- Space heater
- Combi

Combi boilers with integral DHW cylinder (domestic hot water) are a hybrid combination of the first and second version. These are in demand due to the relatively small size and good characteristics.

The module developed as part of this work controls a flow water heater for room heating. The response is relatively fast due to the small capacity. Parameters are adapted, especially the startup time and the minimum temperature difference of outgoing and incoming fluid. The module can be used to control boilers with larger tanks, but the startup time in that case is likely to be much longer and temperature difference of outgoing and incoming fluid established during this time is smaller. User interface of the module allows setting these parameters. If the permitted range is not sufficient it's quite simple to extend it in the code.

The essential components of the gas water heater for heating a room (Figure 1.1.) are: Burner, Heat exchanger, Fan, Circulation pump, Controllable Valves, Water pipes, Chimney.

Heat exchanger allows transfer of heat from one medium to another, and can be implemented in a way to touch the media, or to be separated by partitions which prevent their direct contact. In that case it transfers the heat from hot gases to the water in hot water pipes. The use is very widespread, from household heaters and refrigerators, to automotive and industrial devices. A key element is a network of pipes or barrier that separates the two environments. Medias are usually exposed to different pressure. Heat transfer involves convective heat transfer from the first fluid to the barrier, conduction through the barrier and convection to the second fluid.

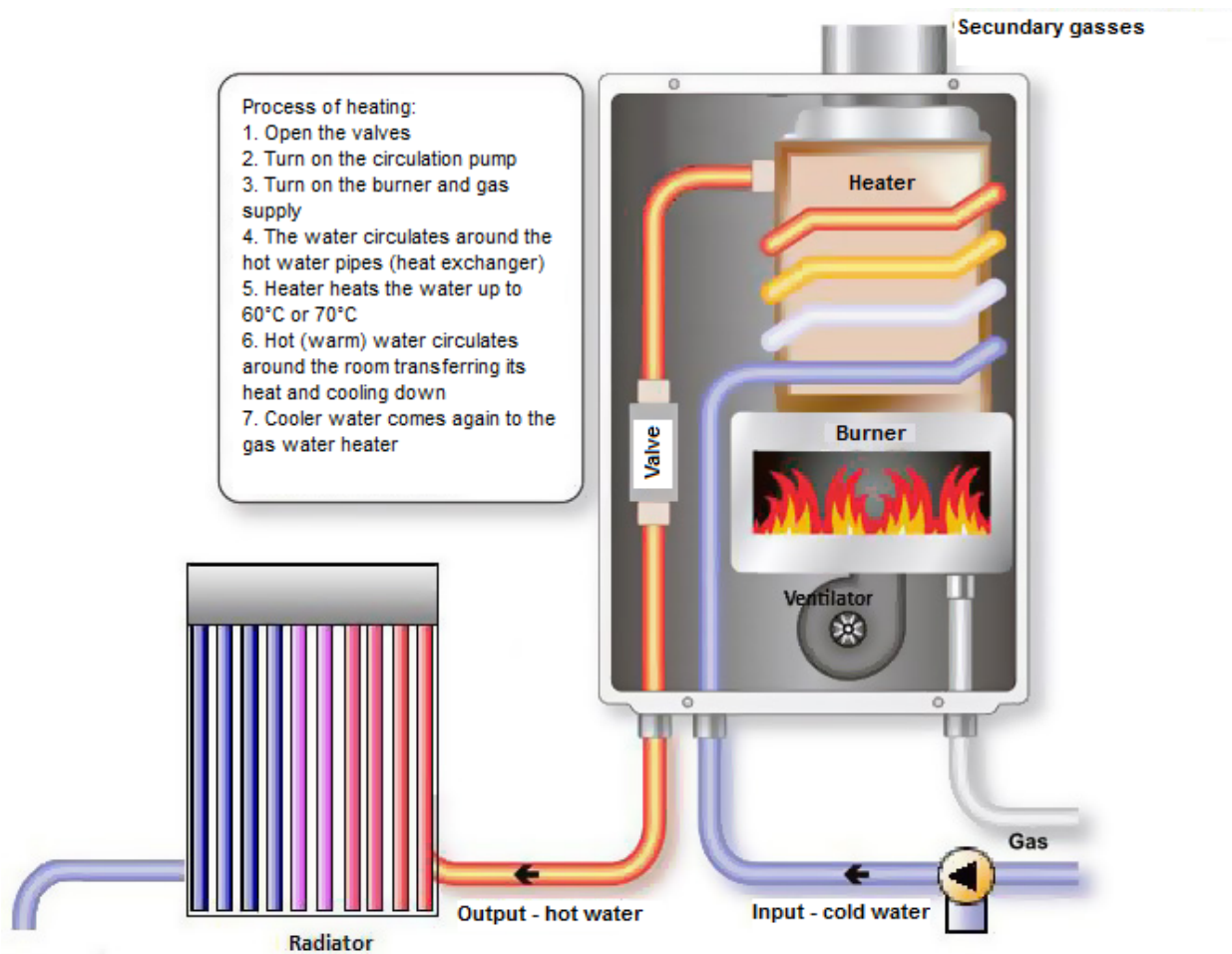


Figure 1.1. Configuration of the gas boiler and the heating process

1.3. Heat transfer

There are three ways of heat transfer: conduction, convection and radiation. The first two will be addressed, because their combination transmits energy from the hot gases to the liquid. Heat $Q[J]$ moves from areas of higher temperature to regions of lower temperature until thermal equilibrium is established.

1.3.1. Conduction

Let's introduce two physical variables:

The heat flux - heat that is transferred per unit time through a surface S .

$$\Phi[W] = \iint_S \vec{q} \cdot \vec{dS} = \frac{dQ}{dt} \quad (1.3.)$$

\vec{dS} is a vector perpendicular to the elementary part of the surface, with an intensity equal to the area of the elementary part of the surface.

$$\vec{dS} = \vec{n}_0 \cdot dS \quad (1.4.)$$

The density of heat flux - The specific heat flux $\vec{q} \left[\frac{W}{m^2} \right]$, ie. the average flux through a surface. According to the definition:

$$d\Phi = \vec{q} \cdot \vec{dS} \quad (1.5.)$$

According to the Fourier's law, it is known that:

$$\vec{q} = -\lambda \overrightarrow{grad}(T) \quad (1.6.)$$

The vector of density of heat flux is collinear with the temperature gradient. So, the gradient $\overrightarrow{grad}(T)$ defines the direction of the heat transfer. The coefficient of proportionality is a scalar λ . A negative sign indicates that heat diffuses in the direction of decreasing temperature. The overall heat flux is a scalar value, in contrast to the density of heat flux.

From (1.5.) and (1.6.) follows:

$$d\Phi = \vec{q} \cdot \vec{dS} = -\lambda \cdot \overrightarrow{grad}(T) \cdot \vec{dS} \quad (1.7.)$$

The elementary flux $d\Phi$ from (1.7.) is the amount of heat that is transferred through an elementary part dS of the surface S per unit time. From (1.3.):

$$dQ = \Phi \cdot dt = \left(\iint_S \vec{q} \cdot \vec{dS} \right) \cdot dt \quad (1.8.)$$

To find the total amount of heat transferred after time t through the whole surface S , it is necessary to integrate the equation:

$$Q = \int_0^t \Phi(t) \cdot dt = \int_0^t \left(\iint_S \vec{q} \cdot \vec{dS} \right) \cdot dt \quad (1.9.)$$

Applying (1.6.) gives:

$$Q = \int_0^t \Phi(t) \cdot dt = \int_0^t \left(\iint_S -\lambda \overrightarrow{grad}(T) \cdot \vec{dS} \right) \cdot dt \quad (1.10.)$$

In order to simplify (1.10) let's introduce presumptions:

Presumption 1: Overall flux through a surface S is constant over time t .

$$Q = \Phi \cdot t \quad (1.11.)$$

Presumption 2: The vector of density of heat flux is the same for every part of the surface S .

$$\Phi = \vec{q} \cdot \vec{S} \quad (1.12.)$$

These assumptions imply that the vector of density of heat flux is time invariant on each part of S during the time t . This conclusion can not be made taking into account only the first presumption, because it speaks about the time constancy of the total flux through the surface S , not on the time constancy of flux through parts of the surface.

In (1.12.) vector \vec{S} is given as the arithmetic mean of all N unit vectors $\vec{\Delta S}_n$:

$$\vec{S} = \frac{\sum_{n=1}^N \vec{\Delta S}_n}{N} \quad S = \sum_{n=1}^N \Delta S_n \quad (1.13.)$$

$\overrightarrow{\Delta S}_n$ vectors are perpendicular to the corresponding „flat“¹³⁵ parts of the surface S, with an intensity equal to the area of the corresponding "flat" part. As surfaces are usually not broken into "flat" segments, it is necessary to go with $N \rightarrow +\infty$ and choose infinitely small segments $\overrightarrow{\Delta S}$ which meet the requirement (1.14.):

$$\sum_{n=1}^M \Delta S_n < \varepsilon, \quad \forall \varepsilon \in \mathbb{R} \quad \wedge \quad \forall M \in \mathbb{N} \quad (1.14.)$$

Sum of the areas of a final number of parts of the surface S should be less than no matter how small real number ε . From (1.13.) follows (1.15.):

$$\overrightarrow{S} = \lim_{N \rightarrow \infty} \frac{\sum_{n=1}^N \overrightarrow{\Delta S}_n}{N} \quad S = \lim_{N \rightarrow \infty} \int_{n=1}^N dS_n \quad (1.15.)$$

Presumption 3: Surface through which heat is transferred is flat.

All points on the surface lie on the same plane. It is relatively easy to find the numerical value of the area and the direction of the vector perpendicular to the plane.

The expression for calculating the gradient is given by (1.16.):

$$\overrightarrow{grad}(T) = \left(\frac{\partial T(x, y, z)}{\partial x}, \frac{\partial T(x, y, z)}{\partial y}, \frac{\partial T(x, y, z)}{\partial z} \right) \quad (1.16.)$$

If the temperature T of the equation (1.6.) changes in all three coordinate directions, then the components of the vector of density of heat flux are given by (1.17.):

$$q_x = -\lambda \frac{\partial T(x, y, z)}{\partial x} \quad q_y = -\lambda \frac{\partial T(x, y, z)}{\partial y} \quad q_z = -\lambda \frac{\partial T(x, y, z)}{\partial z} \quad (1.17.)$$

Presumption 4: Heat is transmitted only in the direction of z axis.

Now the vector of density of heat flux is always in the direction of the z axis, ie:

$$\vec{q} = \left(0, 0, -\lambda \frac{\partial T(x, y, z)}{\partial z} \right) = \left(0, 0, -\lambda \frac{dT(x, y, z)}{dz} \right) = (0, 0, q_z) \quad (1.18.)$$

Due to the Presumption 2 the vector of density of heat flux and the vector perpendicular to the surface S are collinear and from (1.12.) follows:

$$\Phi = \vec{q} \cdot \vec{S} = q \cdot S \quad (1.19.)$$

Here is also assumed that the direction of \vec{S} coincides with the direction of \vec{q} .

Presumption 5: Let the surface S be homogenized so that the temperature changes in the direction of the z axis according to a law which is a constant on the surface S. Now the temperature does not depend on (x, y) coordinates so we can write:

$$\vec{q} = \left(0, 0, -\lambda \frac{\partial T(z)}{\partial z} \right) = \left(0, 0, -\lambda \frac{dT(z)}{dz} \right) = (0, 0, q_z) \quad (1.20.)$$

¹³⁵ "flat" parts of surface S where all points lie on the same plane

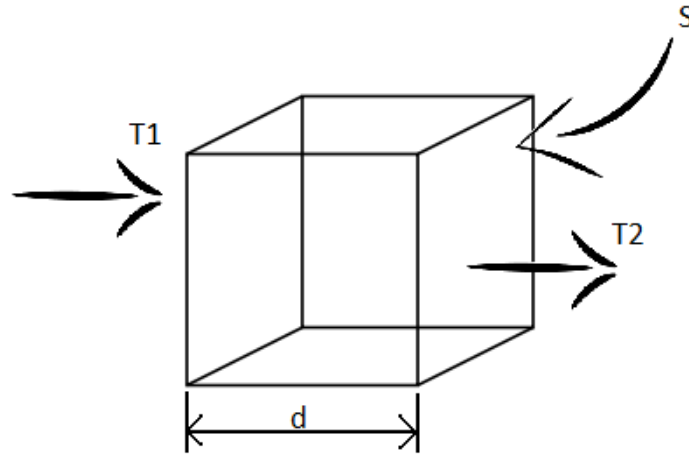


Figure 1.2. The body of a homogeneous material through which conduction is performed

The coefficient of proportionality λ is not completely constant for a given material. It's a coefficient of thermal conductivity and it depends on:

- bulk density of the material
- chemical composition
- moisture content
- temperature

Strictly, it depends on time and position (x,y,z). Conduction happens as the energy transmits from particle to particle. Let the body be as in Figure 1.2.

Presumption 6: Let the coefficient of thermal conductivity λ be constant for the body.

Taking into account all of the presumptions listed above, and knowing that the temperature of the body changes only with the z axis (horizontal axis in Figure 1.2.):

$$q = q_z = -\lambda \frac{dT(z)}{dz} \quad (1.21.)$$

where λ is a constant.

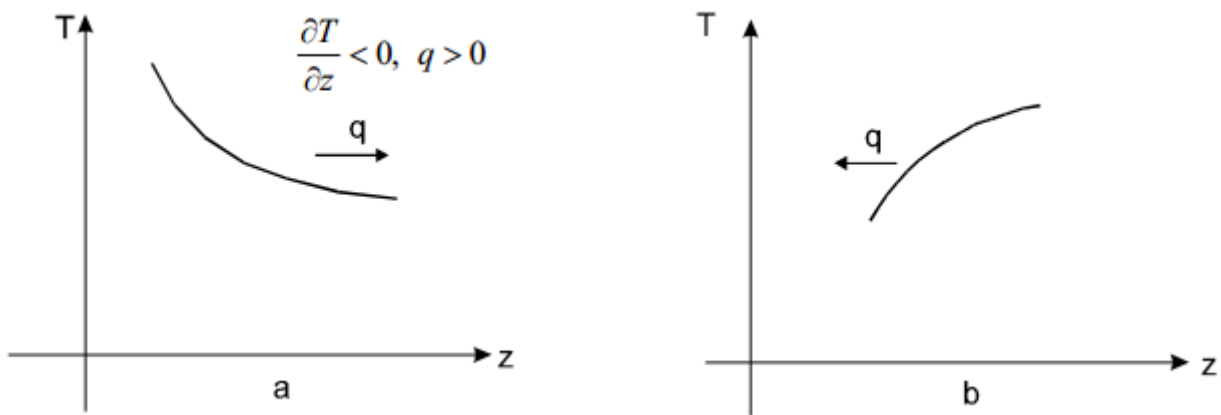


Figure 1.3. The direction of the vector of density of heat flux

Now these equations are valid:

$$Q = \Phi \cdot t = q \cdot S \cdot t = \lambda \cdot \frac{dT(z)}{dz} \cdot S \cdot t \quad (1.22.)$$

In the last expression minus sign is omitted. It only tells about the direction of heat transfer, and since only scalar values are observed now, the direction will be ignored. The heat is transferred only in the direction of the biggest temperature drop.

Presumption 7: Let the heat conduction through the plane of a wall of thickness d be stationary. Let the area of surface S be at temperature T_1 , and another side of the same size at T_2 .

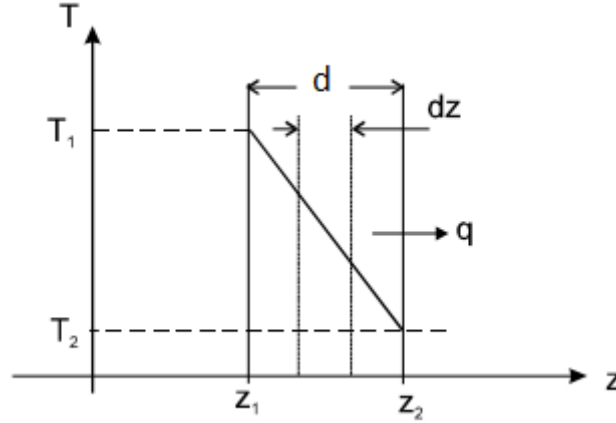


Figure 1.4. Stationary heat conduction through the wall

The difference in relation to the Figure 1.3. stems from the fact that in the case of stationary heat conduction derivative of density of heat flux remains constant along the axis z .

$$Q = \Phi \cdot t = q \cdot S \cdot t = \lambda \cdot S \cdot \frac{T_1 - T_2}{d} \cdot t \quad (1.23.)$$

Thermal conductivity λ can be defined as the amount of heat [J] per time unit which passes through the cross-sectional area of 1 m^2 and of thickness of 1 m perpendicular to the surface at the temperature of 1 K . This assumes a linear temperature change along the material (1.24.).

$$\lambda = \frac{Q}{A \cdot (T_1 - T_2)} \cdot \frac{d}{t} \left[\frac{\text{W}}{\text{m} \cdot \text{K}} \right] \quad (1.24.)$$

The coefficient of thermal transmittance Λ is equal to the ratio of the coefficient of thermal conductivity of material and its thickness d :

$$\Lambda = \frac{\lambda}{d} \left[\frac{\text{W}}{\text{m}^2 \text{K}} \right] \quad (1.25.)$$

The coefficient of thermal transmittance is equal to the amount of heat per unit time which passes vertically through unit area of the construction element of thickness d at the unit temperature difference between the surface boundaries of the element once it reached steady state. Resistance to leakage of heat R is reciprocal to the coefficient of thermal transmittance:

$$R = \frac{1}{\Lambda} \left[\frac{\text{m}^2 \text{K}}{\text{W}} \right] \quad (1.26.)$$

The greater the thermal resistance, the better insulator.

1.3.2. Convection

Convection is the transfer of heat from one fluid (gas or liquid) to a solid body, or vice versa. Convection can be classified according to the cause of movement. Therefore, there are:

- Natural convection (fluid particles move due to the difference in density caused due to uneven temperature).
- Forced convection (movement of fluid is supported by some mechanical device).

Heat transfer by convection is calculated using Newton's law, where the density of the heat flux is represented by the formula:

$$q = h_c \cdot (T_p - T_f) \left[\frac{W}{m^2} \right] \quad (1.27.)$$

q - density of heat flow, $\left[W / m^2 \right]$

h_c - convection coefficient, $\left[W / (m^2 \cdot K) \right]$

T_p - temperature of solid surface, [K]

T_f - fluid temperature, [K]

1.3.3. Heat exchanger

As noted above, the exchange of heat between two fluids (gas or liquid) happens via a heat exchanger. This includes convection from the first fluid to the barrier, conduction through the barrier and convection to the second fluid. The parameter that characterizes such heat transfer is called the heat transfer coefficient of the exchanger (K):

$$K = \frac{1}{\frac{1}{\alpha_i} + \frac{d}{\lambda} + \frac{1}{\alpha_e}} \left[\frac{W}{m^2 \cdot K} \right] \quad (1.28.)$$

α_i - internal heat transfer coefficient. It is equal to the amount of heat per unit time which moves from hot gases in the combustion chamber to a heat exchanger's unit area at unit temperature difference of air and surface of the exchanger.

α_e - the coefficient of the external heat transfer. It is equal to the amount of heat per unit time which passes from the unit surface of the exchanger to the fluid at unit temperature difference between the exchanger's surface and fluid.

The coefficient K is equal to the amount of heat which passes vertically per unit time through unit area of the exchanger at unit temperature difference between fluids from both sides of the element. The heat transfer coefficient can be expressed using heat resistance:

$$K = \frac{1}{R_i + R + R_e} \quad (1.29.)$$

$R_i = \frac{1}{\alpha_i}$ - the resistance of the internal heat transfer

$R_e = \frac{1}{\alpha_e}$ - the resistance of the external heat transfer

$R = \frac{1}{\Lambda}$ - resistance to leakage of heat

Resistance of heat transfer (R_0) is the reciprocal value of the heat transfer coefficient of the exchanger:

$$R_0 = \frac{1}{K} = R_i + R + R_e \quad (1.30.)$$

The value of the coefficient of heat transfer can be used to assess the loss of heat from a room. For a barrier of thickness d made of many different materials in layers d_1, d_2, \dots, d_n , and for different temperatures of end surfaces (T_1 i T_n), at a certain point of time a state of linear temperature change will be established at the intersections of individual layers of the barrier.

$$q = \frac{Q}{S \cdot t} = \frac{\lambda \cdot (T_1 - T_n)}{d} \quad (1.31.)$$

As the density of heat flow is equal for layers and the entire barrier (due to the assumption that the heat is transmitted only in the direction of the horizontal axis), follows (1.32.):

$$\frac{\lambda_1}{d_1}(T_1 - T_2) = \frac{\lambda_2}{d_2}(T_2 - T_3) = \dots = \frac{\lambda_{n-1}}{d_{n-1}}(T_{n-1} - T_n) \quad (1.32.)$$

From this equation follows (1.33.):

$$\begin{aligned} T_1 - T_2 &= \frac{d_1}{\lambda_1} \cdot q \\ T_2 - T_3 &= \frac{d_2}{\lambda_2} \cdot q \\ &\vdots \\ T_{n-1} - T_n &= \frac{d_{n-1}}{\lambda_{n-1}} \cdot q \end{aligned} \quad (1.33.)$$

Summing up the above equations, the expression for the density of heat flux is given by:

$$q = \frac{T_1 - T_n}{\sum_{i=1}^{n-1} \frac{d_i}{\lambda_i}} \quad (1.34.)$$

1.4. Control of the gas water heater

This paper is about a control module that controls only the burner and circulation pump. Therefore, assumptions must be determined which the system must meet before installation of the specified module. The assumptions are listed below:

- 1) There is an already implemented system that opens all valves automatically once the pump is turned on to ensure the smooth circulation of water (if such valves exist).

- 2) When the circulation pump is activated (in the state ON), pre-implemented system must enable occasional discharge and replacement of water.
- 3) When the burner is turned on, the appropriate valves for the gas supply are automatically opened and the combustion process is initiated.
- 4) The removal of secondary gases is regulated in an appropriate manner.
- 5) The burner must have internal control which prevents overheating of the water exiting the boiler. The temperature of the outgoing fluid typically does not exceed 60°C, although there may be systems where it goes up to 70°C. No matter for how long the burner is ON, the outgoing fluid temperature must not be close to the boiling point.

1.4.1. Model of control

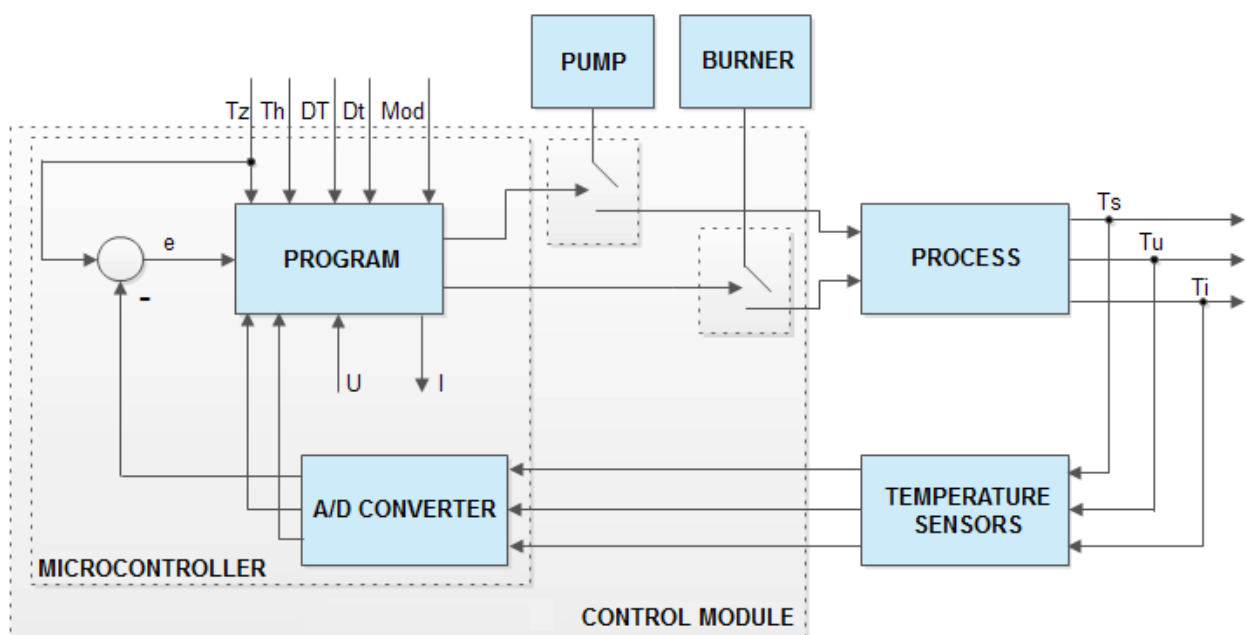


Figure 1.5. Structural block diagram of the control system

Once connected to the appropriate boiler system, the control module provides the following functionality:

- Turning ON the module and system
- Maintaining the room temperature T_s
- Displaying of temperatures T_u , T_i , T_s , hysteresis T_h , status of pump and burner circuit, mod of the module (auto/manual)
- Setting temperatures (and other parameters)
- (TCP/IP communication over a LAN, with the possibility of insight into the values that appear on the display and setting parameters the same way like when using the keyboard)

As seen in the previous picture, the composition of the module has a microcontroller with accompanying shield boards (ethernet shield, shield to connect with other components), relays for control of the pump and burner, display and a keyboard. "U" indicates that the signal represents a command sent by the user, while "I" denotes a signal sent from the module to the

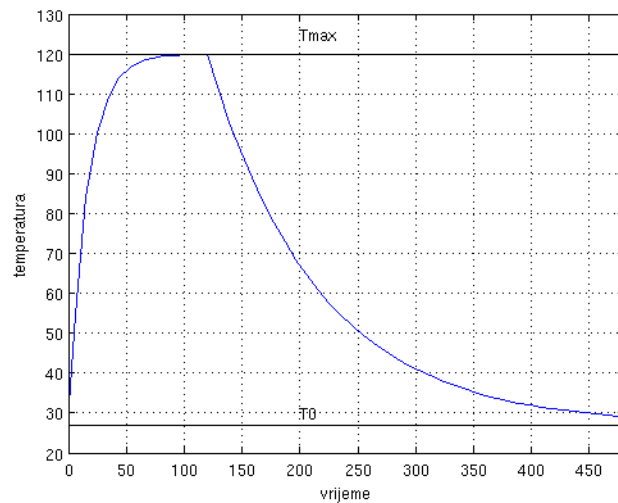
user (preview of all available options, preview of values of variables and parameters, messages and responses to commands sent via the Telnet protocol).

Temperature usually belongs to the class of processes of slow dynamics. It allows the sample period to be large enough so that the processor can perform all of its functions in a relatively short period of time (immediately after the sampling), within the period T . Clock speed of Arduino Uno microcontroller (16 MHz) allows the entire loop of the program to be carried out in a few milliseconds. Time constant of the process is several tens of minutes, so the condition of sampling theorem is certainly fulfilled. There was no need for precise determination of the sampling time. Moreover, in the program there was no need to perform synchronization, so the sampling period is a bit variable (it never exceeds 10 milliseconds). Use of delay in order to fixate the time of loop execution (or for any other purpose) would lower the response speed of the module.

1.4.2. Two-point regulation

The algorithm of temperature control is two-position regulation. The term „two-position controller“ is derived from the position of the output (either "on" or "off"). This system regularly includes hysteresis. The dynamic behavior of the process of heating and cooling will be approximated with the differential equation of the first order:

$$G_{ob} = \frac{K_{ob}}{Ts + 1} \cdot e^{-\tau}$$



a) transfer function

b) system response

Figure 1.6. Thermodynamic system as a first order system

Time constants of heating and cooling are generally different. The parameters specified in the transfer function are:

K_{ob} - gain coefficient;

T - inertial time constant of the process;

τ - transport delay;

The transport delay is too small compared to the inertial time constant of the process. Therefore, the dynamic behavior of the temperature can be represented by the following differential equation:

$$T \cdot \frac{dx}{dt} + x = K_{kr} \cdot l(t) \quad (1.36.)$$

x - output variable (temperature) versus time, response to the excitation signal of step function

T - inertial time constant of the process

K_{kr} - the magnitude of the final value of the output variable (steady state)

$K_{po\check{c}}$ - the initial value of the output variable, tj. $x(0) = K_{po\check{c}}$

$l(t)$ - Heaviside unit step function

If we look at the system in the time interval: $t \in (0, \infty)$, then the equation is:

$$T \cdot \frac{dx}{dt} + x = K_{kr} \quad (1.37.)$$

Particular solution is: $x_{par} = K_{kr}$. A homogeneous solution can be found by solving the following equation:

$$T \cdot \frac{dx}{dt} + x = 0 \Rightarrow \frac{dx}{dt} = -\frac{x}{T} \Rightarrow x_{hom} = C \cdot e^{-\frac{t}{T}} \quad (1.38.)$$

The general solution is:

$$x(t) = K_{kr} + C \cdot e^{-\frac{t}{T}} \quad (1.39.)$$

Let's take into account the initial condition:

$$x(0) = K_{po\check{c}} = K_{kr} + C \Rightarrow C = K_{po\check{c}} - K_{kr} \quad (1.40.)$$

$$x(t) = K_{kr} + (K_{po\check{c}} - K_{kr}) \cdot e^{-\frac{t}{T}} = K_{kr} - (K_{po\check{c}} - K_{kr}) \cdot e^{-\frac{t}{T}} \quad (1.41.)$$

The derived equation describes the behavior of a thermodynamic system, and will be used to describe the behavior of a two-position controller. When this control system is applied to the first order system, output characteristics are given by:

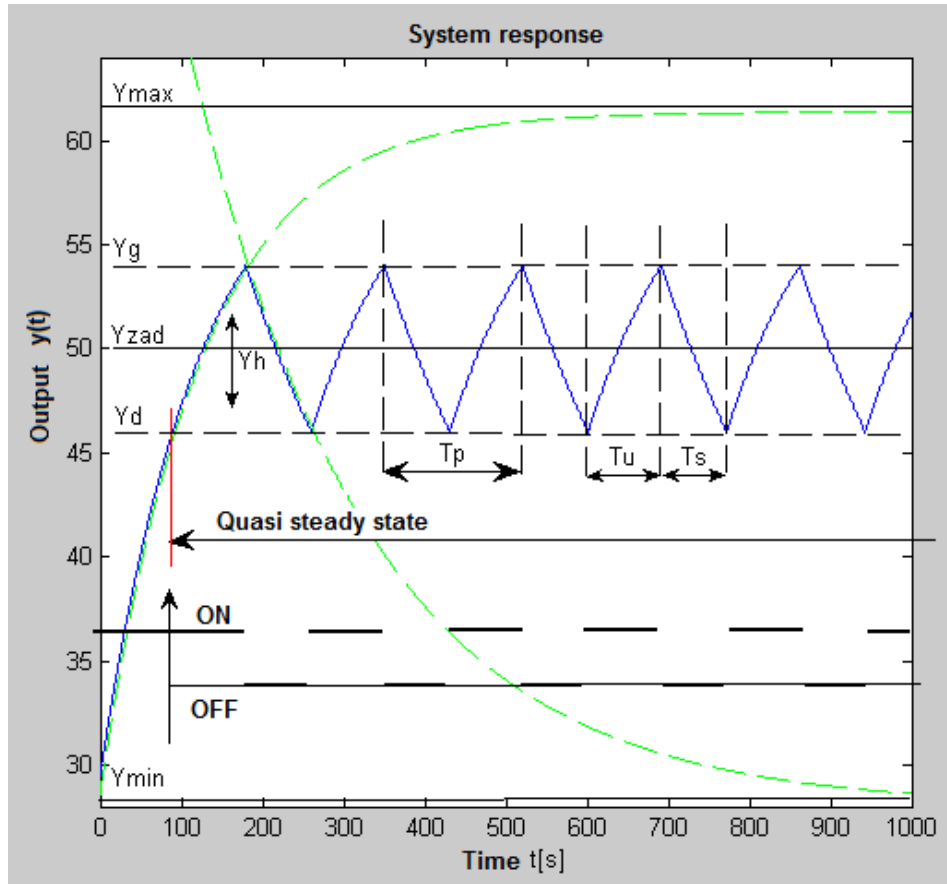


Figure 1.7. Response of the system regulated by two-position controller

Y_{\max} - the maximum value that the output variable would achieve with heater always ON

Y_{\min} - the minimum value that the output variable would achieve with heater always OFF

Y_{zad} - setpoint value of output temperature

Y_g - upper threshold

Y_d - lower threshold

Y_h - hysteresis

The value of output during the quasi-steady state has a value in the range:

$$(Y_{zad} - Y_h, Y_{zad} + Y_h)$$

T_p - quasi oscillation period

T_u - duration of pulse signal „ON“

T_s - duration of pulse signal „OFF“

1.4.2.1. Analytical expressions

$$Y_g = Y_{zad} + Y_h \quad (1.42.)$$

$$Y_d = Y_{zad} - Y_h \quad (1.43.)$$

$$T_p = T_u + T_s \quad (1.44.)$$

If the time constants of ascending and descending functions are equal, then: $T_u = T_s$. Let the quasi oscillatory state begin at the moment $t=0$. While the burner is in the state ON, the following equation describes the system:

$$Y(t) = Y_{\max} - (Y_{\max} - Y_d) \cdot e^{-\frac{t}{T_{uzli}}} \quad (1.45.)$$

The time required to reach Y_g is T_u :

$$\begin{aligned} Y(T_u) = Y_g &= Y_{\max} - (Y_{\max} - Y_d) \cdot e^{-\frac{T_u}{T_{uzli}}} \\ \Rightarrow T_u &= T_{uzli} \cdot \ln \frac{Y_{\max} - Y_d}{Y_{\max} - Y_g} \end{aligned} \quad (1.46.)$$

If the time constants are equal:

$$T_u = T_s = \frac{T}{2} \quad (1.47.)$$

The equation for T_s can be derived from (1.46.), if we:

T_{uzli} replace with T_{sili}

Y_{\max} replace with Y_{\min} ,

Y_d replace with new initial condition $Y(0) = Y_g$,

Y_g replace with Y_d , because that is the final value to which the output falls.

$$T_s = T_{sili} \cdot \ln \frac{Y_{\min} - Y_g}{Y_{\min} - Y_d} \quad (1.48.)$$

Taking into account the equations (1.42.) and (1.43.): $Y_g = Y_{zad} + Y_h$; $Y_d = Y_{zad} - Y_h$; we get final equations in a way where intervals of heating and cooling depend on Y_h and Y_{zad} :

$$T_u = T_{uzli} \cdot \ln \frac{Y_{\max} - Y_{zad} + Y_h}{Y_{\max} - Y_{zad} - Y_h} \quad (1.49.)$$

$$T_s = T_{sili} \cdot \ln \frac{Y_{\min} - Y_{zad} - Y_h}{Y_{\min} - Y_{zad} + Y_h} \quad (1.50.)$$

$$T = T_u + T_s \quad (1.51.)$$

Lowering hysteresis Y_h would reduce the amplitude of oscillations and a higher accuracy would be achieved. However, it would lead to an increase in the switching frequency which reduces the life of the relay (switch/actuator). It is necessary to find a compromise between the lifetime of actuator and accuracy of control. The user can select the value of hysteresis from the range $T_h \in [0.5^\circ\text{C}, 7^\circ\text{C}]$.

1.4.2.2. Simulation of two-position control

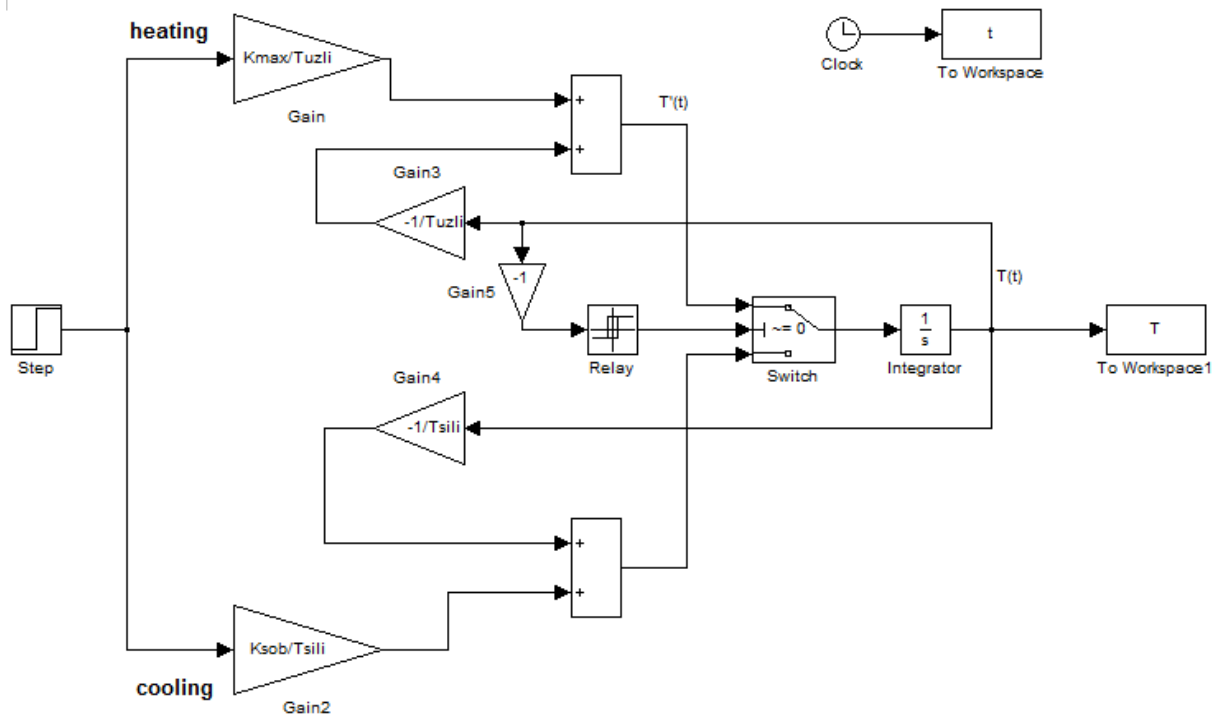


Figure 1.8. Simulink model of automatic regulation of a thermodynamic system

The resulting data can be demonstrated in a simulation of the control system in the Simulink software package. obtained responses are as in Figures 1.9. and 1.10.

The values of the parameters for the simulation are selected only to demonstrate the two-position control. The real module is configured so that the desired temperature can not be set outside of a predefined range $T_{zad} \in [8^{\circ}\text{C}, 35^{\circ}\text{C}]$.

Table 1.1. The parameters for the simulation of two-position control (Example 1)

T_h	T_{zad}	$T_{poč}$
4°C	50°C	28°C

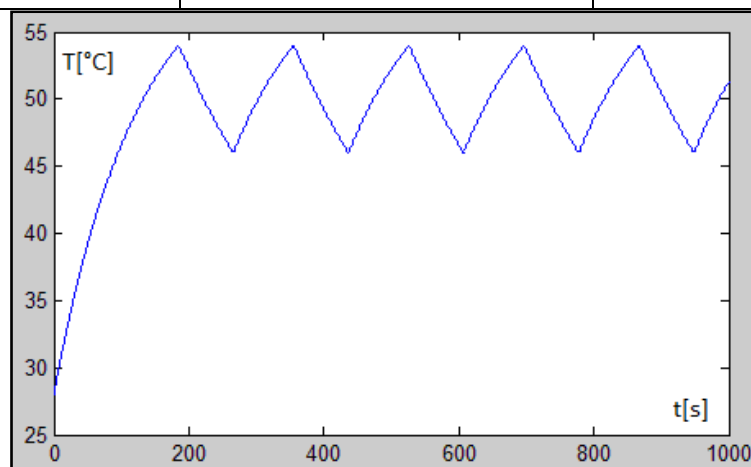


Figure 1.9. The response of the simulated system (Example 1)

Table 1.2. The parameters for the simulation of two-position control (Example 2)

T_h	T_{zad}	$T_{poč}$
4°C	50°C	28°C

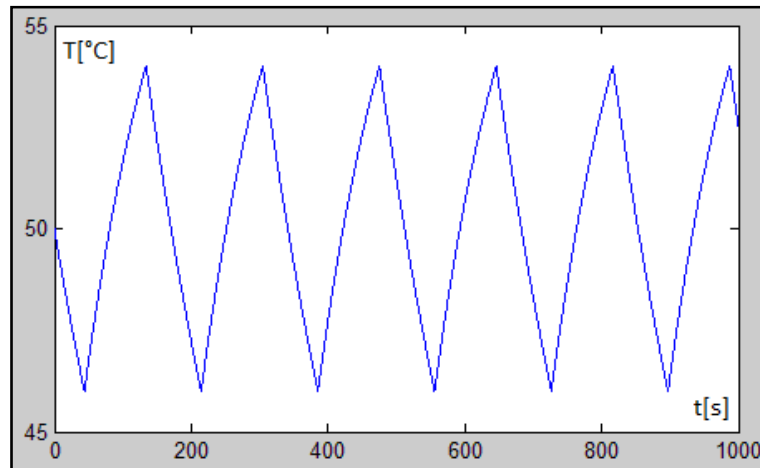


Figure 1.10. The response of the simulated system for (Example 2)

2. The hardware structure of the control module

The microcontroller is the central component of the module. It also provides interaction with other components which are necessary to complete the functionality of the system. Electrical scheme was created in a form in which the shield was actually realized (Appendix 2).

2.1. List of used components

Table 2.1. List of used components

Num	Element	Type	Label	Quantity
1.	Microcontroller	Arduino Uno	Based on ATmega328	1
2.	Adapter	AC/DC (9V)		1
3.	Two-point switch	Mechanical handle		1
4.	Membrane keypad	4x4		1
5.	LCD display	48x84 monochromatic	Nokia 3110	1
6.	Ttemperature sensor	Linear	LM35DZ	3
7.	Relay module	With 2 relays	Ywrobot 2 relay	1
8.	Three-state circuit	DIL	SN74LS244N	1
9.	Ethernet shield	Arduino	Based on Wiznet W5100	1
10.	LED diode			2
11.	Resistor		410 Ω	2
12.	Resistor		1.5 $k\Omega$	6
13.	Resistor		2.1 $k\Omega$	5
14.	Resistor		6.8 $k\Omega$	5
15.	Connectors			

2.2. Arduino Uno mikrokontroler

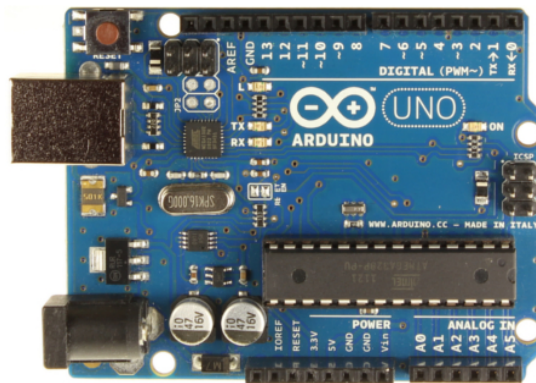


Figure 2.1. Arduino Uno microcontroller

Table 2.2. Overview of main features

Microcontroller	ATmega328
Operating voltage	5V
Vcc voltage (recommended)	7-12V
Vcc limits	6-20V
Digital I/O pins	14 (6 support PWM output)
Analog input pins	6
DC current per I/O pin	40 mA
DC current limit for 3.3V pin	50 mA
Flesh memory	32 KB (ATmega328) 0.5 KB for bootloader
SRAM	2 KB (ATmega328)
EEPROM	1 KB (ATmega328)
Clock speed	16 Mhz

2.3. Shield for connection with other components

In order to successfully connect display, keyboard, relays, sensors and LED diodes with the microcontroller, a shield that can easily connect with the Arduino has been developed (Appendix 2). Basic characteristics related to individual components will be presented here, with some notes about the wiring.

2.3.1. Nokia display 3110

It is a monochrome display as shown in Figure 2.2.



Figure 2.2. Nokia display 3110

Specifications:

- 48x84 pixels
- Interface with a serial bus with maximum speed of 4 Mbit/s
- Internal controller PCD8544
- LED illumination
- Working at voltages 2.7 – 5.0 V (recommended 3.3V)
- Low consumption, suitable for battery-powered devices
- The permitted temperature range: -25°C do 70°C

2.3.1.1. Addressing LCD display

The addresses in the memory (DDRAM) are arranged in a matrix of 6 rows (Y-address 0 to 5) and 84 columns (X address 0 to 83). Appropriate combinations address data bytes. The data sent to the display are 8-bit (1 byte), and are arranged to be vertical. In this case, the most significant bit (MSB) is at the bottom (Figure 2.3).

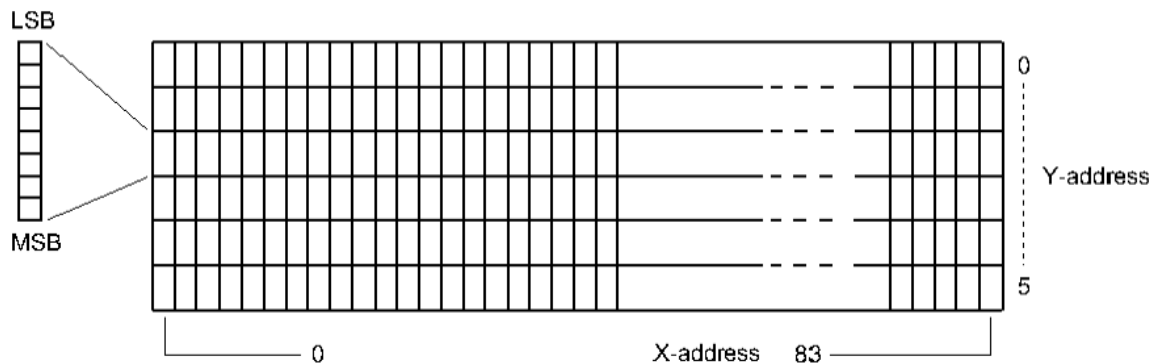


Figure 2.3. The structure of addresses and data of the LCD display

Data can be entered at the address in the memory (DDRAM) sequentially, and the value of X-address and Y-address will automatically increase. There are two methods:

- Vertical addressing mode (V=1). After each written byte, Y address increases by one.
- Horizontal addressing mode (V=0). After each written byte, X address increases by one.

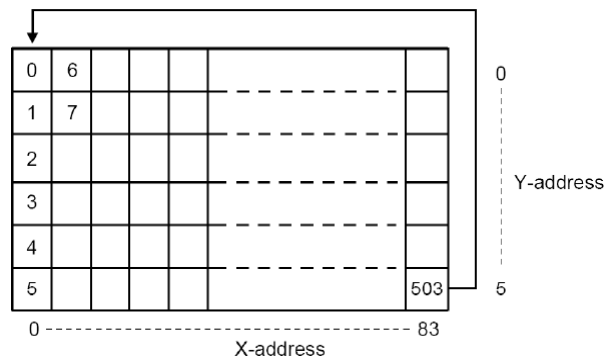


Figure 2.4. Vertical addressing mode

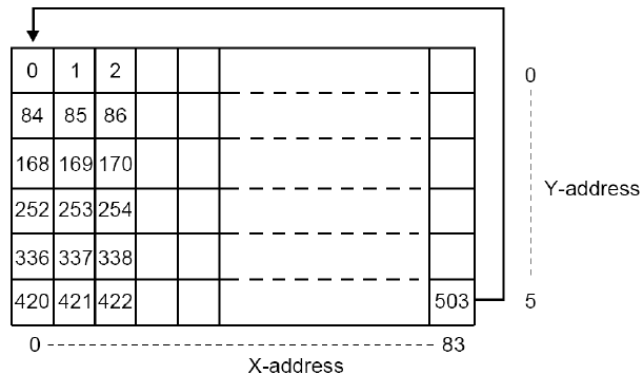


Figure 2.5. Horizontal addressing mode

2.3.1.2. The pins to control LCD display

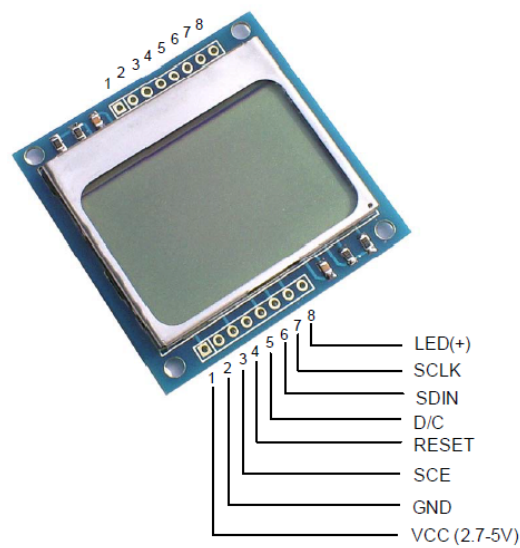


Figure 2.6. Pins of LCD display

Table 2.3. Pins of LCD display

Pin name	Function
1. VCC	Voltage supply (2.7 – 5V), 3.3V recommended
2. GND	Ground
3. SCE	Enable transfer
4. RESET	Reset signal for current operation of the LCD
5. D/C	Pin to set the type of signal (data or command)
6. SDIN	The line for serial data transmission

7. SCLK	Clock
8. LED	Pin to control the brightness of the display

2.3.1.3. Communication modes

Format of the command used to communicate with the LCD is divided into: the command mode and data mode. Pin D/C is used for the differentiation of these two types. If the D/C = 0 then the data that is sent to the LCD is a command, otherwise it is data that will be entered into DDRAM memory and displayed. After entering bytes in DDRAM memory address value will automatically increase. Format of data is serial and the first bit sent is the MSB:

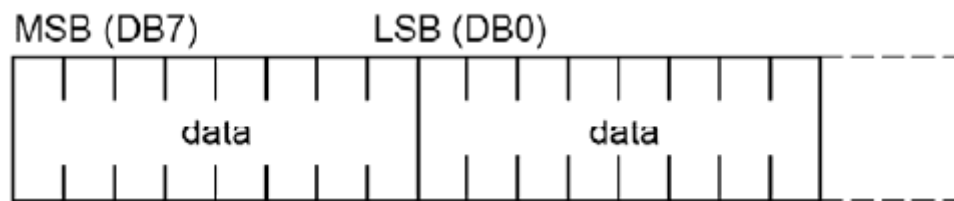


Figure 2.7. Serially distributed data sent to the display

There are two methods of sending data to LCD:

- Sending of one byte at a time (Figure 2.8.) and
- Sending of a series of consecutive bytes (Figure 2.9.)

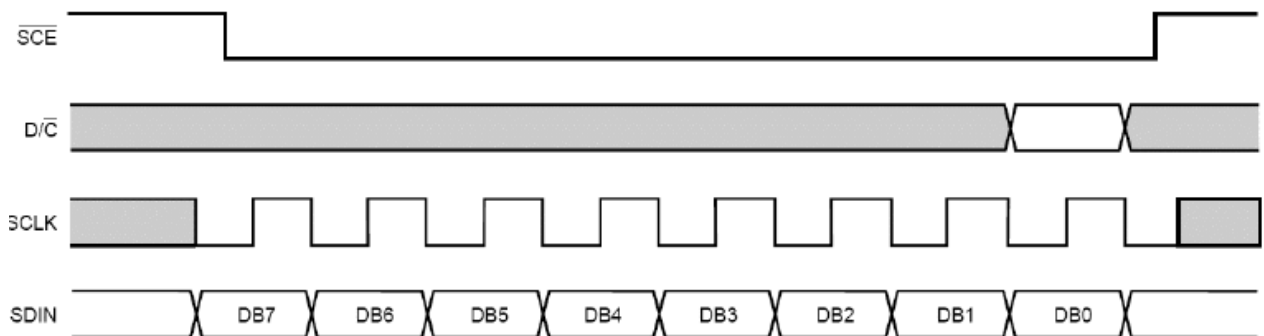


Figure 2.8. Sending of one byte at a time

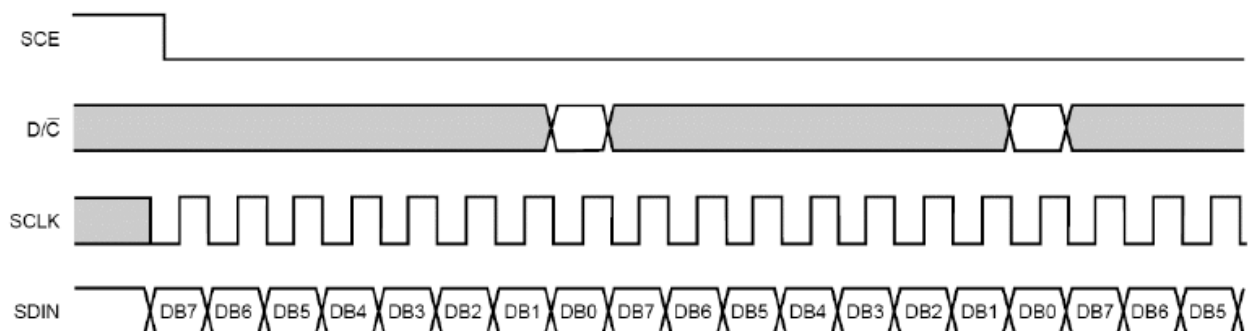


Figure 2.9. Sending of a series of consecutive bytes

If the pin SCE has a value of logical one, any change of SCLK signal will have no effect on the display. The user can send data to the LCD display only when the value of the SCE is set to logical zero. Data is sent via SDIN input and follows time interval of the clock (rising edge). LCD concludes if it is a data for DDRAM or a command according to the logical value

on pin D/C. If $D/C = 0$, then it's a command, otherwise it's data. Pin SCE should retain the value 0 until the data is successfully transferred. More information and a list of commands can be found in the datasheet of the LCD display. As a part of the program developed in the context of this work, finished libraries were used to send commands to the LCD display. The display is connected to the input/output pins of a microcontroller via voltage dividers which lower the output voltage of the microcontroller pins to about 3.3V. Voltage dividers consist of serially linked resistors (2.1k and 6.8k). If the pin has logical one, the output gives $5 * (1 - 2.1 / 6.8) = 3.45V$ which is acceptable voltage for the LCD. Between 4 pins of the microcontroller and the voltage dividers there is a three-state circuit SN74LS244 which will be discussed below.

2.3.2. Membrane keypad 4x4

This keyboard provides the possibility of developing an appropriate interface for the user of the embedded system. These keyboards use a combination of 4 rows and 4 columns of conductors that overlap, but do not touch each other until the button is pressed. The microcontroller detects which button is pressed by detecting the position of the short circuit between a row and a column.

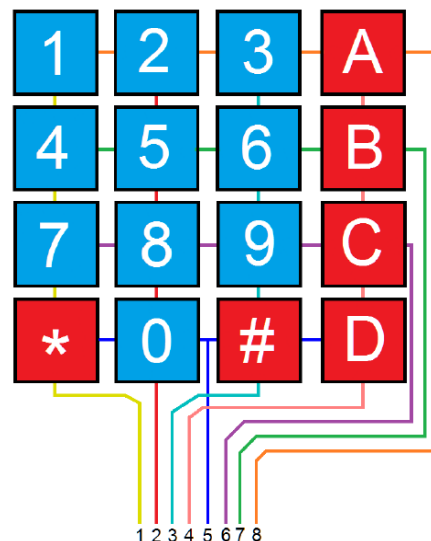


Figure 2.10. Scheme of a matrix membrane keyboard 4x4

It is possible to make a function that returns an array of all pressed buttons. In this work a function that returns a single pressed character has been created (section 3.2.).

2.3.3. SN74LS244 (three-state chip)

This is a DIL chip with 20 pins. There are two lines, each with 4 channels. Each line can be switched off (brought into the third state), so that the logical value of the input has no effect on the output. If the line is not brought into the third state, channels just forward unchanged input signals to the output.

It was necessary to share some pins between components. For the realization of all functionalities of the module there had to be 20 digital and 3 analog pins (analog pins are used

for getting a temperature from each of the three sensors. That's a total of 23 pins, while the microcontroller has 14 digital and 6 analog pins, which in total gives 20. Analog pins can be used as digital, and lack of 3 pins will be compensated by using the three-state circuit to share 4 pins between display and keyboard. 1 pin is required for control of the chip, so saving is not 4 pins but 3. A component that can be occasionally turned off is the display. Wiring is shown in Appendix 2, which contains a comprehensive electrical schema of the shield.

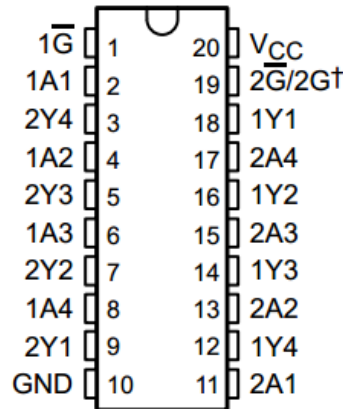


Figure 2.11. SN74LS244

This circuit is powered by a + 5V. Pin 1 is brought to + 5V so that the line 1G is always off. This is done to prevent rapid change of the output state in these channels due to the possible effects of noise. Pin 19 is a command pin which occasionally brings 4 pins connected to the display into the state of high impedance. On the right side, inputs 2A4, 2A3, 2A2 and 2A1 are connected to the digital pins 5, 6, 7, 8 of Arduino respectively. Pin 9 of the microcontroller has the role of SCE pin for display (it's brought directly to the voltage divider, not through the circuit with three states). While the display is off, the pin SCE is set to the value of the logical one, so that the noise of the output of the three-state circuit can not result in unpredictable behavior of the LCD display.

In addition, it was noted that the display is still blocked as soon as the pins: SCLK, SDIN, D/C, and RESET disconnect from the microcontroller using the three-state circuit. RESET pin should not fall to logical zero while SCE is set to logical one. Therefore the RESET pin is linked through a 1.5k resistor to +5V. It will remain at +5V as long as the display is turned off (resistor has a role of a pull-up resistor). There were no blockades of the LCD display after adding the resistor in the circuit. All other resistors on the electrical scheme of the shield have a role to limit electricity.

Outputs 2Y4, 2Y3, 2Y2 and 2Y1 were brought to voltage dividers, which lead to the pins of the display: 4 (RESET), 5 (D/C), 6 (SDIN) and 7 (SCLK) respectively. These pins are in the state of high impedance during the time of checking the pressed key of the keyboard. After that, they are reactivated. The possible short circuits caused by pressing keys do not result in excessive currents due to 4 resistors of 1.5k which limit the current.

2.3.4. Temperature sensor LM35

The module measures: the temperature of the incoming and outgoing liquid, and the room temperature. LM35DZ provides output voltage linearly dependent on temperature. The increment of temperature of 1°C causes increment of voltage of 10mV. Given that this is a 10 bit D/A conversion, the microcontroller can distinguish 1024 voltage values in the range of 0 to 5V.

$$5 / 1024 \approx 0.0049\text{V} \approx 5\text{mV}$$

This means that precision can not be greater than 0.5°C . However, through the software it is possible to use internal voltage of 1.1V as the upper limit for A/D conversion. This is done, and the scope is reduced. As the scope is reduced, the difference between quantum levels decreased:

$$1.1 / 1024 = 0.00107\text{V} \approx 1\text{mV}$$

The accuracy increased significantly and now stands at $1/10^{\circ}\text{C}$. That's why the module's UI provides the possibility to set parameters and measure variables with precision of one decimal place after decimal coma. This scope could be further reduced by using the AREF pin.

These sensors do not heat up much when turned on (0.08°C in still air). They have non-linearity of $\pm 1 / 4^{\circ}\text{C}$. The module is not configured to measure temperatures below zero, so all of those values are considered zero. The sensors provide accuracy of $\pm 3 / 4^{\circ}\text{C}$ for the entire range of 0 to 100°C .

2.4. Ethernet shield

Arduino Ethernet shield allows an Arduino microcontroller to connect to a network (LAN, Internet) via Ethernet cable. Its hardware, software and complete documentation are open-source and available on the Internet.

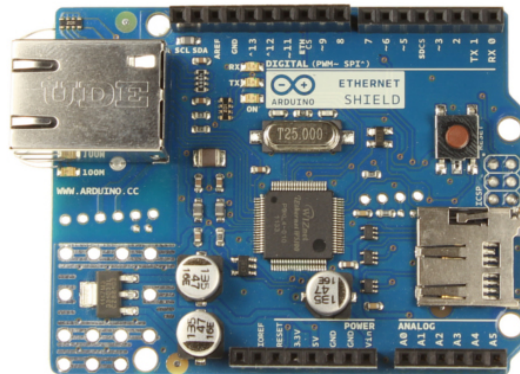


Figure 2.12. Ethernet shield

Specifications and requirements

- It is necessary to have the Arduino development board
- It has an ethernet controller: W5100 with internal 16 KB buffer
- Connection Speed: 10/100 Mb
- Communicates with Arduino using SPI

Description

The shield is based on Wiznet W5100 Ethernet chip. Wiznet W5100 allows networking with support for TCP and UDP. It allows up to 4 simultaneous connections. The shield leaves the

pin interface of Arduino intact, so it can be connected to another shield, and it was done. The shield has a place for micro-SD card that can be used to store server files.

The shield has a reset controller that ensures that the W5100 Ethernet module is properly reset at startup. There is a PoE module developed by open-source Internet community which exploits the power of the conventional Ethernet cable, thus reducing the power consumption. PoE module does not come with an Ethernet shield, but can be purchased as a separate component.

Arduino communicates with W5100 and SD card using the SPI via digital pins 11, 12, 13. Pin 10 is used to select communication with the W5100 and pin 4 to select communication with SD. These pins can not be used as standard inputs or outputs. Since the W5100 and SD card share the same SPI channel, it's impossible to communicate simultaneously with both components. If we want to exclude communication with the SD card, we need to declare the output pin 4 and set it to logical one. This is why seemingly nothing is connected to pins 4, 10, 11, 12 and 13 (These pins are used by Ethernet shield).

3. The software for the Arduino UNO

The code has been developed in the Arduino software environment. Parameters can be set by the user in a number of ways. All parameters remain written in the EEPROM. This chapter explains important segments of the program, the way in which the connection is established with individual components and relevant commands.

3.1. Communication with display

For communication with the display there are two included libraries:

```
#include <Adafruit_GFX.h> // Graphics
```

```
#include <Adafruit_PCD8544.h> // Basic functions Nokia LCD
```

In order to do appropriate initialization of the display it is necessary to define the pins and certain variables that are necessary for the proper functioning of the library:

```
byte pinDisplayControl=14; // A0 as a digital pin
```

```
byte pinDisplaySCE=9; // Digital pin
```

```
// ----- INITIALIZATION OF THE DISPLAY -----
```

```
// Adafruit_PCD8544(SCLK,SDIN,D/C,SCE,RESET);
```

```
Adafruit_PCD8544 display =
```

```
Adafruit_PCD8544(pinKey[0],pinKey[1],pinKey[2],pinDisplaySCE,pinKey[3]);
```

```
#define XPOS 0
```

```
#define YPOS 1 // The starting position of DDRAM
```

```
#define DELTAY 2
```

```
#define LOGO16_GLCD_HEIGHT 16
```

```
#define LOGO16_GLCD_WIDTH 16 // Size of logo
```

```
// -----
```

To use commands from the library "Adafruit", the setup of the program must turn the display on through the three-state circuit, initialize the object display, set the desired contrast and display the logo of Adafruit (manufacturer of the library).

```
pinMode(pinDisplayControl,OUTPUT);
digitalWrite(pinDisplayControl,LOW); // Turn on
display.begin(); // Initialization
display.setContrast(42);
display.display(); // Logo
```

The display redraws itself every second and on a valid user interaction. Here are some commands that were used in the code:

```
display.clearDisplay();
// Clears screen
display.drawLine(x1, y1, x2, y2, BLACK);
// A line from the point (x1,y1) to the point (x2,y2)
display.setTextSize(size);
// The size of the text to be printed. If size=1 each character occupies 5x8
// pixels. If size=2, then characters occupy 10x16 pixels.
display.setCursor(x,y);
// Set the cursor to the default position
// Y should be increased by 8 (if TextSize=1) to move to a new line
display.print(F("Text"));
// Prints a string message, automatically moves the cursor in front of the text
display.println(F("Text"));
// After printing a string message goes to a new line and puts the cursor at the beginning of x
axis
```

Arduino Uno has only 2 KB of SRAM. By putting F in front of strings, they are stored in the Flash memory (Arduino has considerably more Flash memory, 32 KB).

3.2. Detection of the pressed key on the keyboard

This is, as noted earlier, reduced to detection of the short circuit occurred between a row and a column of the matrix keyboard. One of the most common ways in which this can be done is the following:

- Include pull-up resistors to limit the current through pins that are connected to rows of the keyboard. They will be inputs with voltage 5V, unless a short circuit brings logic 0 (through resistors with much lower resistance than the resistance of the pull-up resistors).
- Set all the columns (1 to 4 on the keypad) to logic 0 (at 0V)
- Check if the voltage of one of the rows is brought down to 0V. If so, then it is known that at least one key is pressed from the line.

If we want to find out which button is pressed, it is necessary to carry out the same procedure for the column, and detect the column of the pressed button. The initialization related to the keyboard has the following commands:

```
// ----- Initialization-----
```

```

char matrix[4][4] = {
    {'1','2','3','A'},
    {'4','5','6','B'},
    {'7','8','9','C'},
    {'*','0','#','D'}
};
char customKey=0;      // Pressed key, not released yet
char currKey=0;        // The auxiliary variable
boolean readyForKey=true; // While true, keystroke is to be accepted
// -----

```

The role of these variables is best seen in the following code snippet:

```

if (!readyForKey) { // Pressed, not released yet
    currKey=getKey();
    if (!currKey || currKey!=customKey) readyForKey=true;
    // Released, or a new one is pressed,
    // the program is ready to execute a new key command.
}

```

readyForKey serves as an indicator that the program is ready to take a new command. Otherwise a command would be accepted a large number of times instead of just once. This is especially important when entering parameters via prompt. The function that performs the task of detecting which button is pressed is defined by the following code:

```

char getKey() { // Get pressed key
    byte red=10, kolona=10;
    Timer1.stop();
    for (byte i=0; i<=3; i++) {
        pinMode(pinKey[3-i],INPUT_PULLUP); // All rows to +5V (enable pull-up
                                           // resistors)
        pinMode(pinKey[7-i],OUTPUT);
        digitalWrite(pinKey[7-i],LOW); // Columns to LOW
    }
    for (byte i=0; i<=3; i++) {
        if (digitalRead(pinKey[3-i])==LOW) {
            // That's the one
            red=4-i; break;
        }
    }
    Timer1.resume(); // Continue the timer, as it will do all
                     // necessary things to avoid wrong key detection
                     // if an interrupt happens below
    for (byte i=0; i<=3; i++) {
        pinMode(pinKey[7-i],INPUT_PULLUP); // Columns to +5V
        pinMode(pinKey[3-i],OUTPUT);
        digitalWrite(pinKey[3-i],LOW);    // Rows to LOW
    }
}

```

```

for (byte i=0; i<=3; i++) {
  if (digitalRead(pinKey[7-i])==LOW) {
    // That's the one
    kolona=4-i; break;
  }
}
red--; kolona--;
if (red>4 || kolona>4) return 0; // If still 10 something is wrong
else return matrix[red][kolona];
}

```

It is important to notice that time interrupts must be temporarily stopped at one part of the function. During the time of the interrupt execution the screen is being rendered, but keyboard and display share 4 pins. Use of the display may not only disturb the logic value of the pins, but also their mode of operation (which can be either an output or an input). It would lead to incorrect key reading and should not be allowed.

On the other hand, if the termination occurs after the command `Timer1.resume()`; ie. use of the display will not lead to errors in reading as a function that performs rendering calls a function which safely turns the display off through the three-state circuit and returns the value of shared pins to LOW, so that the function `getKey()` can continue its execution safely.

The time interrupt can occur at any part of the program unless it has previously been disabled. It can be seen that there are parts of the program where the execution of an interrupt is unacceptable.

3.3. EEPROM memorija

Arduino Uno has 1 KB of EEPROM memory (Electrically Erasable Programmable Read Only Memory). This memory allows the permanent storage of data as opposed to RAM. It would be possible to use the Flash memory, but in that case a single byte could not be addressed individually. Given these characteristics, EEPROM memory is suitable for storing 5 parameters that the user can specify either over a LAN connection or through the menu and keyboard of the module.

Used libraries:

```

#include <EEPROM.h> // The standard EEPROM library
#include <EEPROM_anything.h> // Generic functions, read/write any
                             // data type from/to EEPROM

```

The second of these libraries was created for the purpose of this paper. It consists of only three generic functions, and its content is provided in Appendix 1. The functions of the generic type can be used within the Arduino program only if they are included in a form of a library.

```

template <class T> int EEPROM_writeAnything(int ee, const T &value)
template <class T> int EEPROM_readAnything(int ee, T &value)
template <class T> void EEPROM_limitVar(const T &limit1, const T &limit2,
                                       const T &def, T &value, int &adress)

```

- **EEPROM_writeAnything:** Accepts integer address and a reference to an arbitrary variable. Executes writing of the variable to EEPROM memory starting from the given address, and returns the number of bytes that the variable occupies in memory.
- **EEPROM_readAnything:** Accepts integer address and a reference to an arbitrary variable. Reads the values from the EEPROM memory starting from the given address. It reads as many bytes as the received variable occupies, and places them in accepted variable passed by reference. Returns the number of loaded bytes.
- **EEPROM_limitVar:** Accepts 4 arbitrary variables of an equal type and a reference to an integer value representing the address in the EEPROM. The first two variables set the range. If the variable "value" is not from the given range, its value is set to the value of the variable "def" and as such is entered into the EEPROM memory over its old value. Address will be increased by the number of bytes of the variable "value", and the function returns nothing (void).

The following function demonstrates the use of the above functions:

```
void ucitajEEPROM() {
  adresa=0;
  // The order of variables must remain unchanged even though type can
  // be changed
  din_adr[0]=adresa; adresa+=EEPROM_readAnything(adresa,Tzadano);
  din_adr[1]=adresa; adresa+=EEPROM_readAnything(adresa,Histereza);
  din_adr[2]=adresa; adresa+=EEPROM_readAnything(adresa,Dtime);
  din_adr[3]=adresa; adresa+=EEPROM_readAnything(adresa,DTmin);
  din_adr[4]=adresa; adresa+=EEPROM_readAnything(adresa,mod);
  // Take the addresses, to access and change variables later
  // EEPROM: 0,1,2,3|4,5,6,7|8,9|10,11,12,13|14
  adresa=0;
  EEPROM_limitVar(8.0,35.0,20.0,Tzadano,adresa);
  // Executed only if EEPROM has invalid data
  EEPROM_limitVar(0.5,7.0,3.0,Histereza,adresa);
  // Address automatically increases within the function
  EEPROM_limitVar(1,60,15,Dtime,adresa);
  EEPROM_limitVar(1.0,30.0,4.0,DTmin,adresa);
  if (mod>0) mod=true; else mod=false;
  EEPROM_writeAnything(adresa,mod);
}
```

We see that the parameters occupy only 15 bytes of EEPROM memory. $3 \times 4 = 12$ bytes for double type, 2 bytes for an integer value (Dtime) and 1 byte for the logical value of the module's work mod (Manual/Auto).

If the entire code is loaded on an Arduino Uno microcontroller for the first time, then the EEPROM could have some unpredictable values. To ensure that the values are within the predefined limits, the generic function EEPROM_limitVar is used to bring the value back to the default scope.

3.4. Time interrupts

Interrupts are special events that can lead to the controlled interruption of the current piece of code to call the appropriate piece of code that "handles" the interrupt. Interrupt Driven Programming is a very powerful paradigm that significantly simplifies the implementation of complex systems on a microcontroller.

To use the time interrupts in the program, it is necessary to include the library:

```
#include <TimerOne.h> // For a time interrupt.
```

The setup of the program executes the following commands:

```
Timer1.initialize(1000000); // Initialization of interrupt in us
```

```
Timer1.attachInterrupt(provjeriCrtaj); // This function will run every second
```

When the time interrupt occurs, provjeriCrtaj() function will be called, and after that the microcontroller will proceed with the execution of code. Its main role is to count seconds. The countdown starts when the burner is turned on and starts from the value Dtime. When Dt falls to 0 (Dtime seconds after the burner has been turned on), then this function checks if the system works. It checks inequality: $DT > DT_{min}$. As soon as it is not true, the boiler and burner are switched off and an appropriate message about the defective functioning is displayed to the user. Testing is done only if the burner is turned on, after the startup time.

The secondary role of this function is rendering the screen every second. Which screen is drawn, depends on the value of a state variable:

```
byte state=1; // 1-main screen, 2-MENU, 3-prompt
```

4. TCP/IP communication and Telnet protocol

One of the main features of today's embedded systems is the ability to be accessed over the Internet. For example, it is possible to use cell phones, laptops, PCs, or other devices to remotely turn on the water heater, light or air conditioning in the apartment. One possible way to achieve this is demonstrated in this chapter.

4.1. TCP/IP and Telnet protocol

TCP / IP is a group of protocols named after the two most important protocols: TCP (Transmission Control Protocol) and the IP protocol. TCP / IP can be used to communicate across a variety of interconnected networks, and is today's most widely used protocol on LAN and Internet.

Table 4.1. 4-layer model, TCP/IP group of protocols

Layer	Protocol
Application	DNS, DHCP, TLS/SSL, TFTP, FTP, HTTP, IMAP, IRC, NNTP, POP3, SIP, SMTP, SNMP, SSH, Telnet, BitTorrent, RTP, rlogin, ...
Transport	TCP, UDP, DCCP, SCTP, IL, RUDP, ...
Internet	IP (IPv4, IPv6), ICMP, IGMP, ARP, RARP, ...

Data Access	Ethernet, Wi-Fi, Token ring, PPP, SLIP, FDDI, ATM, DTM, Frame Relay, SMDS, ...
-------------	--

Telnet is a network protocol within the IP group of protocols. The purpose of this protocol is to establish a two-way 8-bit communication channel between two network devices. It is often used to provide a user session for a command line interface to another device. The name comes from the words TELEphone NETwork, which shows that the protocol was designed with the intention of connecting a terminal to a remote device. It is common that the term telnet is used as a name of the interactive client program that lets you connect using the Telnet protocol.

4.2. Arduino code for establishing communication

The header includes a library containing the functions for the proper use of the Ethernet Shield.

```
#include <SPI.h>    // for Ethernet
#include <Ethernet.h> // for Ethernet

    Declared variables necessary for the further course of the program:
// Variables for Ethernet
byte mac[]={0xDE,0xAD,0xBE,0xEF,0xFE,0xEE};
byte ip[]={ 192,168,1,177};
#define textBuffSize 7    // Longest command plus 2 places for CR + LF
char textBuff[textBuffSize]; // For received text
byte charsReceived=0;
boolean connectFlag=false; // To know if a new connection has been created
unsigned long timeOfLastActivity; // Time of last activity [ms]
unsigned long allowedConnectTime = 300000; // After 300000 ms (5 min)
        // of inactivity, Telnet session
        // is closed
EthernetServer server(23); // Telnet, typically goes through the port 23
EthernetClient client=0;
```

In order to make the initialization of object *server*, it is necessary to call the following two commands in the Setup part:

```
Ethernet.begin(mac,ip);
server.begin();
```

The gets a MAC (Media Access Control address) and IP address. Here is used the IP address 192.168.1.177. Range of addresses 192.168.1.0 - 192.168.1.255 is usually used for private LAN. Therefore, the computer that is connected to the module must configure the LAN IP address to be within that range.

Initialization is possible with any of the following function calls:

```
Ethernet.begin(mac);
Ethernet.begin(mac, ip);
Ethernet.begin(mac, ip, dns);
```



```
Ethernet.begin(mac, ip, dns, gateway);
```

```
Ethernet.begin(mac, ip, dns, gateway, subnet);
```

The module acts as a server, listening awaiting commands. The principle of operation is clearly seen in the following code running in each iteration of the infinite loop:

```
if (server.connected() && !connectFlag) {  
  // If someone accessed the Telnet server, and the session is not open  
  connectFlag=true;  
  client=server.connected();  
  client.println(F("Arduino Telnet Server"));  
  client.println(F("-----"));  
  printHelpMessage();  
  printPrompt();  
}  
if (connectFlag && client.available()) getReceivedText();  
// If there is a new character waiting to be read, and the flag is HIGH  
if (connectFlag) checkConnectionTimeout(); // If session open,  
// check whether to do disconnection for inactivity
```

The function `getReceivedText()`; is used to receive a command sent by the user, and then the function `parseReceivedText()`; interprets the command and calls an appropriate function:

```
void parseReceivedText() {  
  switch (textBuff[0]) {  
    case 'i' : ispisiVarijable(); break;  
    case 'A' : promjTzad(); break;  
    case 'B' : promjHist(); break;  
    case 'C' : promjDTmin(); break;  
    case 'D' : promjDtime(); break;  
    case 'E' : modus(); break;  
    case 'F' : bojlerch(); break;  
    case 'R' : restart(); client.println(F(" Modul restartovan")); break;  
    case 'c' : diskonektuj(); break;  
    case '?' : printHelpMessage(); break;  
    case 0x0d : break; // Enter command is ignored  
    default: printErrorMessage(); break;  
  }  
}
```

4.3. Overview of available commands

Commands which module recognizes are listed in the following table:

Table 4.2. The list of available commands that module recognizes

Syntax	Function
i	print all significant variables
Axx.x	change setpoint of the room temperature (8,35). For

	example: A27.5
Bxx.x	change hysteresis (0.5,7). For example: B4.1
Cxx.x	change DTmin (1,30). For example: C5.2
Dxx	change Dtime (1,60). For example: D20
Ex	change mod, x=0 manual, x=1 automatic. For example: E0
Eu	turn burner on (only in manual mod)
Ei	turn burner off (only in manual mod)
Fu	turn boiler on
Fi	turn boiler off
R	restart of the module
c	disconnection
?	help: prints all commands

4.4. Demonstration using the Telnet client php website

After correctly connecting the module to a boiler system and to a computer (or a router) with an Ethernet cable, we run a web server on a LAN with a website implemented specifically for demonstration of the module's interface. Opening of the web page displays the following screen:

TELNET PHP CLIENT Izlistaj komande

Arduino LAN IP: 192.168.1.177 Port: 23 Connect timeout: 10

Unesite komandu:

Posalji komandu

Odziv servera:

```

Arduino Telnet Server
-----
Komande:

i      -ispisi varijable
Axx.x  -promijeni Tzadano (8,35). NPR: A27.5
Bxx.x  -promijeni Histerezu (0.5,7). NPR: B4.1
Cxx.x  -promijeni DTmin (1,30). NPR: C5.2
Dxx    -promijeni vrijeme Dtime (1,60). NPR: D20
Ex     -promijeni mod, x=0 manual, x=1 automatic. NPR: E0
Eu     -ukljuci plamenik
Ei     -iskljuci plamenik
Fu     -ukljuci bojler
Fi     -iskljuci bojler
R      -restartuj modul
c      -diskonekcija
?      -pomoc: ispisuje sve komande

```

Figure 4.1. Telnet php client, home page

The predefined variables within the PHP script filled fields: IP address, Port and Connect timeout. If the module is not properly connected, that is, if communication is not established after 10 seconds, a message will appear as shown in Figure 4.2.

TELNET PHP CLIENT [Izlistaj komande](#)

Arduino LAN IP:
 Port:
 Connect timeout:

Unesite komandu:

Odziv servera:

Nije uspjela konekcija: A connection attempt failed because the connected party did not properly respond after a period of time, or established connection failed because connected host has failed to respond.

Figure 4.2. Telnet php client, communication error

If everything is fine, then by entering commands a user can control the boiler system. After the execution of each of the commands, the user will get the answer that either confirms that the command is executed successfully, or explanation why it has not been executed. The following figures show a few examples:

Unesite komandu:

Odziv servera:

```

Tsob = 24.6 °C
Tul  = 24.4 °C
Tiz  = 24.4 °C
Tzad = 26.3 °C
His  = 0.5 °C
DT   = 0.0 °C
DTmin= 5.0 °C
Dt   = 0 sec
Dtime= 15 sec
Mod  = MA
Plamenik: Isključen
Bojler  : Uključen
  
```

Figure 4.3. Print variables

Unesite komandu:

Odziv servera:

Vrijednost je izmijenjena

Figure 4.4. Sets the desired temperature to 26.4°C

CONCLUSION

This work shows the entire process of development of the control module for a gas water heater. Starting from the theoretical description, the physicality and the principle of operation of the gas water heater, all necessary requirements for a boiler system are recognised so that the module can be implemented successfully. Development of modern engineering disciplines leads to better performance of hardware structures. The processors are faster, all hardware components are cheaper, smaller, and more reliable. Usually a hardware failure is attributed to the carelessness of users or to the age of the device. On the other hand, the software part of the solution is not subject to aging. However, it is noticeable that the commercial applications as well as embedded systems have errors from time to time. These errors can sometimes lead to a disaster, if it comes to a system with an important function. The reason is that, unlike the process of developing the hardware, one can not introduce standardization in the development of software solutions, nor in testing of the software. When one wants to develop a module system based on a microprocessor technology, it is necessary to achieve the overall functionality using a synergy of hardware and software. Implementation of the hardware system began collecting all relevant data and specifications of components. In particular, one should take into account the limits of voltage and current (and possibly power) which component can be exposed to. Attention was paid to the complexity and price of components. The system is made of very cheap components, but it fulfills all specifications. Shield for connecting components with Arduino consists of ordinary resistors, two LEDs and one three-state chip, while the keyboard is nothing more than a 4x4 matrix of conductors. LED display is worth a few dollars. Arduino and Ethernet shield together cost about 18\$. The system could be created using even cheaper components. Within the described control module, a microcontroller allows us to control output components (LCD, relays, Ethernet response) and it does a correct interpretation of data and commands coming from the input components (sensors, keyboard, Ethernet). Secondary applications developed on a PC (or other device) can utilize this basic interface as part of useful extensions. The module can be improved in several directions. The support for micro-SD card could be used (there are cards of 1 TB capacity). Within the LAN, it would be useful to develop an application that stores the data, displays variables in real time and possibly allows animated and interactive burner, boiler and parameter editing. The module could be extended in terms of supporting independent temperature control for multiple rooms. Accuracy largely depends on the used temperature sensors. This module used sensors LM35DZ which is sufficiently accurate. Greater precision and accuracy can be achieved by using LM35CZ sensors, which are slightly more expensive. One could also prepare a look-up table for thermistors, but simple thermistors have undesired hysteresis and are not suitable for control of a more dynamic rates of change of temperature. It would be nice to make a scheduling CRON web service and an alerting system. Users would be able to schedule automatic water heating at specific time, for example time of cheap tariff. Smart home is a project which is noteworthy and based on pure innovation.

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APPENDIX 1 - A library with generic functions for EEPROM

The use of this library requires the inclusion of the standard Ethernet library for work with EEPROM and the Arduino environment (`#include <EEPROM.h>`).

Content of the library „EEPROM_anything.h“

```
template <class T> int EEPROM_writeAnything(int ee, const T &value) {
    const byte* p = (const byte*)(const void*)&value;
    unsigned int i;
    for (i = 0; i < sizeof(value); i++)
        EEPROM.write(ee++, *p++);
    return i;
}

template <class T> int EEPROM_readAnything(int ee, T &value) {
    byte* p = (byte*)(void*)&value;
    unsigned int i;
    for (i = 0; i < sizeof(value); i++)
        *p++ = EEPROM.read(ee++);
    return i;
}

template <class T> void EEPROM_limitVar(const T &limit1, const T &limit2, const T
&def, T &value, int &adress) {
    // This function returns a variable into the given range,
    // automatically increases the address
    if (value<limit1 || value>limit2) {
        value=def; // “Default” value
        EEPROM_writeAnything(adress,value);
    } adress+=sizeof(value);
}
```

APPENDIX 2 - Electrical scheme of the module

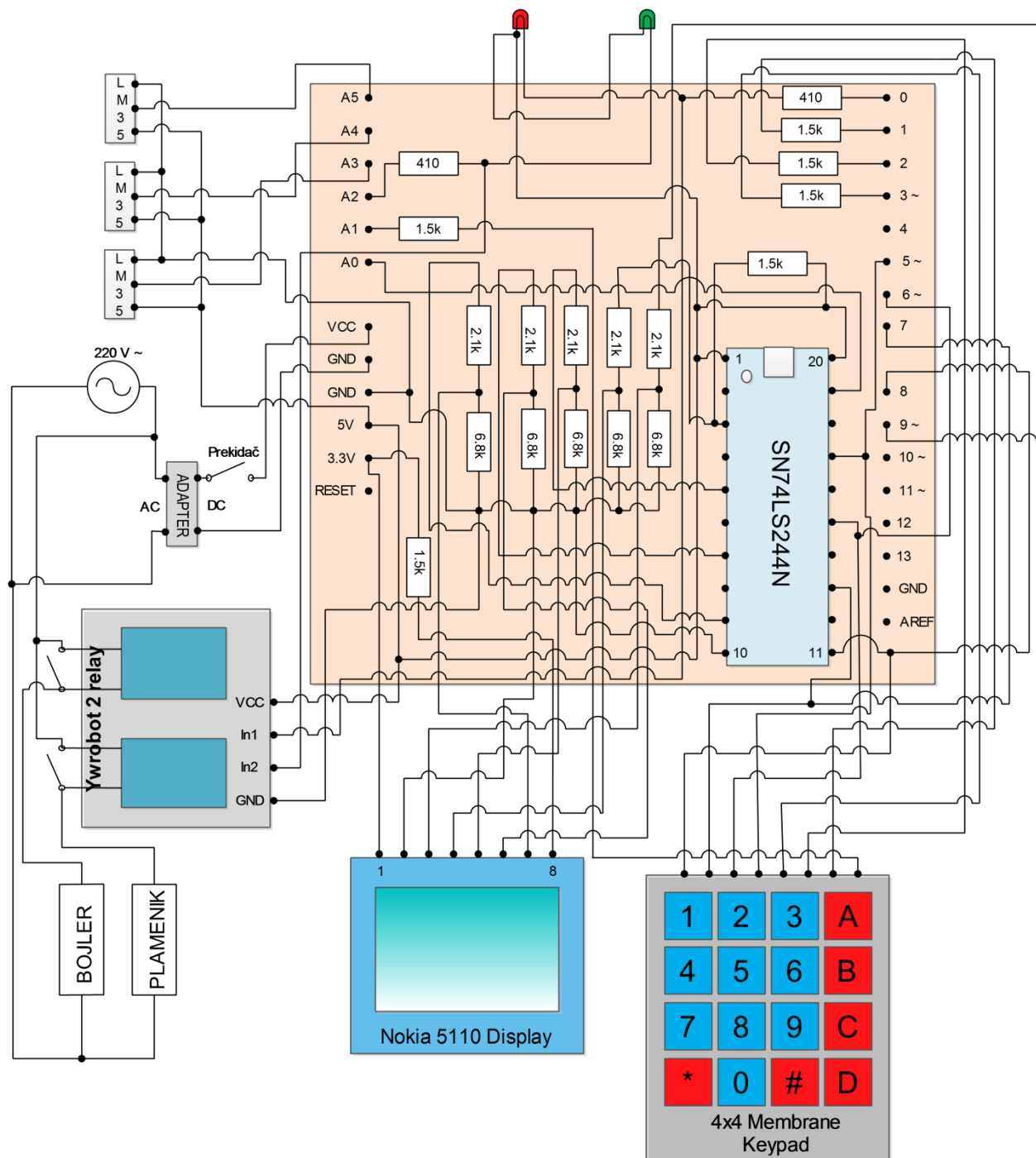


Figure P2.1. Electrical scheme of the module

APPENDIX 3 - The appearance of the implemented control module



Figure P3.1. Appearance of the control module

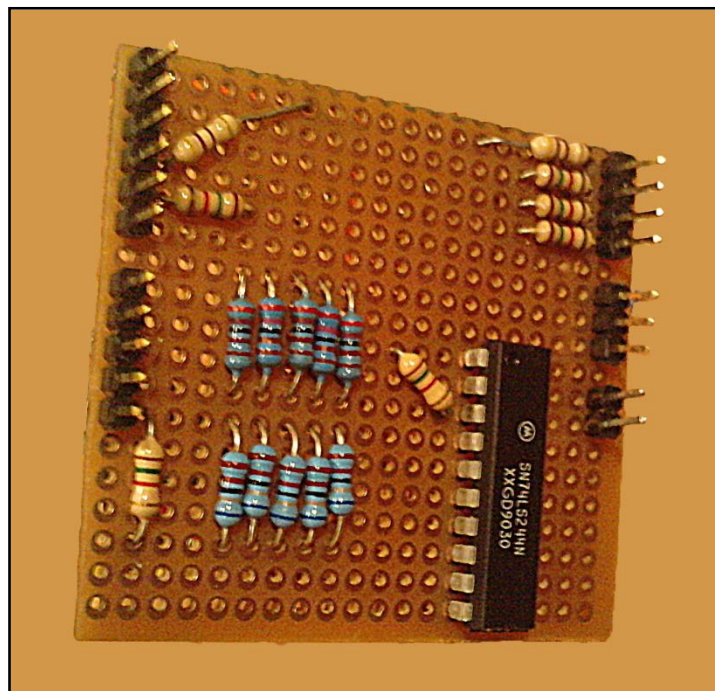


Figure P3.2. Shield board for connection of the microcontroller with other components

Quantitative Analysis of Material –Handling Operations: Case Study

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ABSTRACT

In this article we consider the evaluation of mathematical equations for modelling the operations of the material transport systems. Material- handling is very important and often overlooked issue in every typical industrial facility. It is a part of internal logistics and it occurs inside of a company. The research is based on the case study which has been conducted at local sale company in Gracanica, including semi-structured interviews and review of internal documents. Along with the case study, literature reviews have been conducted within the areas of material-handling operations. The purpose of this research is to identify a mathematical model for material handling operations by analyzing and comparing two types of material transport systems: vehicle-based material system and conveyor system. As a result we will get two different mathematical models for these two material transport systems.

Key words: material handling management, material handling operations, vehicle-based material transport system, conveyor systems

1. Introduction

It is difficult to conceive of a situation, in private life, industry or commerce, where some form of handling does not come into play. The highly competitive environment, linked to the globalization phenomena, demands from companies more agility, better performance and the constant search for cost reduction. Material handling refers to activities, equipment, and procedures related to the moving, storing, protecting, and controlling of materials in a system. Therefore, material handling management is among many factors that contribute to improve a company's performance and it must be performed safely, efficiently, at low price in a timely manner, accurately and without damage to the materials.

The present study is focused on identifying a mathematical model for material handling operations where the two types of material transport systems will be analyzed. Those systems are vehicle-based material transport system and conveyor system. Vehicle-based material transport systems equipment is divided in five categories: industrial trucks, automated guided vehicles, monorails and other rail guided vehicles, some conveyors and cranes and hoists. Conveyor systems can be classified as single direction loop conveyors where we have one way transport loads, namely transportation is done from origination point to destination point, and we have a continuous loop conveyor where the transportation forms a complete circuit.

The case study related in this work was performed in the sale company located in Gracanica in Bosnia and Herzegovina. Company was established in year 1995 as a small

store, but for a relatively short time it is transformed into the very successful company. It has 14 working units and hires over the hundred workers which are highly educated and trained for sale and production. Management of the company, retail trade and wholesale of the construction material, electro-material, transportation and saloon of furniture and electrical devices are placed in the base sale center in Gracanica, on the surface of the 5.500 m².

The company in question, after analyzing sale flow as a whole, identified that among other measures it would be necessary to improve materials handling operations in storage systems. So it is decided to analyze two main types of material transport systems: vehicle-based material transport system and conveyor system.

The main objective of this work is to determine the mathematical model for material handling operations so that we can recognize the influence of different attributes which affects on delivery cycle time. Furthermore, it was necessary to identify the factors that explain the changes in delivery cycle time. To do this, open-ended questionnaires were applied. The respondents-15 people directly linked to daily product flow-were requested to identify the attributes which represents the internal process in more details. Also the close-ended questions were applied after implementation to see whether the change was perceive or not.

Data analysis indicated that the factors, which need to be evaluated, are rate of delivery and number of vehicles required to accomplish the workload. To get this we need to determine total delivery time and available time. These factors have important influence on better performance of material handling management and their operations. Furthermore, after recognition of these factors and by including them carefully in the material handling operation system, we conclude that the material handling system is equal or even better when compared to the previous one.

2. LITERATURE REVIEW

Materials handling makes production flow possible, as it gives dynamism to static elements such as materials, products, equipments, layout and human resources (Stock & Lambert, 2001; Chopra & Meindl, 2001). Groover (2001) highlights that despite its importance, materials handling is a topic that frequently is treated superficially by the companies. However, other authors have perceived its relevance.

The relevance also occurs in another context. Namely, the MHIA estimates that 20% to 25% of manufacturing costs are associated to handling (Groover, 2001, p. 281). According to Sule (1994) Sujono & Lashkari (2006), material handling accounts for 30–75% of the total cost of a product along the production chain, and efficient material handling can be responsible for reducing the manufacturing system operations cost by 15–30%.

Materials handling study requires that several elements are considered. The first is a handling system project, which covers activities of sequencing, velocity, layout and routing (Groover, 2001). In order to complete the analysis, Groover (2001) recommends analyzing the material itself (or object) to be transported. Therefore, it suggests the classification of Muther and Hagan (Groover, 2001), which considers: (i) physical state (solid, liquid, gas); (ii) size (volume, length, width, height); (iii) weight; (iv) condition (hot, cold, dry, dirty, sticky, adhesive); (v) risk of damage (weak or strong); and (vi) safety hazards (explosive, flammable, toxic, corrosive, etc.).

Additionally, the issue of equipment and devices must be examined. Dias (1993) adopts the term “moving” to describe what, in this article, is called management (handling) to adopt the terminology of Groover (2001). When dealing with equipment, Groover (2001) presents a broad classification that covers five categories: (i) transporters (belts, chains, rollers, etc.); (ii) cranes, hoists and lifts; (iii) industrial vehicles (carts, tractors, pallet transporters, forklifts); (iv) positioning equipment, weighing and control (ramps, transfer equipment); and (v) stents and support structures (pallets, holders, reels).

According to Chan, Ip & Lau (1999), a key factor in material handling system design process is the selection and configuration of equipment for material transportation. This is directly related to this study. According to Groover (2001), the equipment should be selected based on some preliminary considerations: take into account the utilization of the factory floor and its load capacity; examine the dimensions of doors and corridors; pay close attention to ceiling height, identify the environmental conditions and their nature, avoid the use of combustion engines traction equipments in storage of food products, meet all safety standards to protect humans and to eliminate the possibility of incurring criminal and civil liabilities arising from accidents, and examine all kinds of available energy options and their capacity to supply required movements.

The right choice of equipment and location of work-in-process is fundamental for the optimization of a company's manufacturing capacity. Bowersox and Closs (1996) state that a critical factor in positioning stocks in process, is a balance between convenience and consolidation to create efficiencies when the stock flows along the value chain.

The determination of a material handling system involves both the selection of suitable material handling equipment and the assignment of material handling operations to each individual piece of equipment (Sujono & Lashkari, 2006). Hence, according to Sujono & Lashkari (2006) material handling system selection can be defined as the selection of material handling equipment to perform material handling operations within a working area considering all aspects of the products to be handled. In this context it is important to mention that, in this study, only the selection of the material handling equipment was considered.

3. PROBLEM AND INTERVENTION DESCRIPTION

The first part of chapter describes situation before the intervention, identifying the problems that were found. The next part presents the factors that motivated the change. And the last part describes the situation after implementation of the changes.

3.1 Situation before intervention

This case study was conducted in the storage sector of a sale company. The storage sector is mainly responsible for inside material handling operations. That includes moving, storing, protecting, and controlling of the finished goods and work in process goods and some raw materials also. Material handling operations are happening inside of storage, between storage and shelves and also between shelves and storage.

In the huge storage, material handling operations require the moving and controlling pallets of products and containers, and sometimes those pallets are really big and heavy, so the workers mostly use forklift truck to move them carefully. In special cases they use towing tractor to move pallets of bricks or tiles.

Often, when a forklift leaves its workplace to transport a container between different parts of storage, delays in setups are generated, causing unnecessary costs and stress on the forklift operator.

The presented problem was: how to analyze two types of material transport systems in company's storage, vehicle-based and conveyor system, in order to evaluate rate of deliveries and number of vehicles to improve performance of material handling management.

3.2 Change Motivators

In our case study, problem is recognized as uncontrolled material handling operations. Because of the non defined procedure of moving products from one place to another, company faces with serious loss, in terms of cost. For this study it is relevant to emphasize functions of storage and information transfer, which occurs simultaneously and has strategic and operational dimensions. The goal is to analyze vehicle-based and conveyor system in storage and improve the performance of material handling management in order to minimize the total cost.

3.3 Applied Changes and Situation after Implementation

The suggestion was to analyze existing material handling operations and implement conveyor system in order to improve workers' safety. Since they use forklifts as a vehicle based material transport system it is suggested to evaluate the mathematical model to see how this system works in order to evaluate the rate of deliveries.

Later, it is suggested to analyze conveyor system and construct the mathematical model for this system also, in order to evaluate material flow rate. Proposition was to analyze existing vehicle-based system and conveyor system and evaluate the mathematical model in order to control material handling operations better.

4. RESEARCH METHODOLOGY

4.1 About the company

Company Zeka-commerce d.o.o was established in year 1995 as a small store, but for a relatively short time it is transformed into the very successful company. It has 14 working units, which are 3 in Lukavica, 3 in Stjepan Polje and the rest of them are in Gracanica. This company hires over the hundred workers which are highly educated and trained for sale and production.

In their 14 working units they offer to their business partners over the thousand products, some of those are: products from their own metal production department, construction material, water proof material, electro material, material for heating, different types of tools, furniture, etc. They also offer transportation services inside and outside the borders of Bosnia and Herzegovina.

In this company, where we managed with thousands of the items material handling management is crucial point, because in order to satisfy the customers and improve the business of the company, management is oriented on planning, controlling and improving the strategies for managing of materials.

4.2 Objectives

Data analysis indicated that the factors, which need to be evaluated, are rate of delivery and number of vehicles required to accomplish the workload. To get this we need to determine total delivery time and available time. These factors have important influence on better performance of material handling management and their operations. In order to do this, it was necessary to identify the factors that explain the changes in performance of material handling operations. Those factors are: total delivery time and available time. To reach this objective, the following specific objectives were established: (i) describe the changes in material handling processes at the company; (ii) evaluate internal material handling flow in storage, and determine influencing factors; and (iii) analyze material handling operations.

4.3 Data collection

The sample was the people directly involved with the daily moving of materials, selected intentionally. The respondents were inventory managers, supervisors, forklift drivers and warehouse operators. Data collection required two stages. The first step was an open ended question survey. Respondents were asked about their perceptions regarding the

controlling of material handling operations after implementation, problems still identified after change implementation and suggestions for the relevant attributes in question.

Performance improvements were measured using the following scale: 1 = much worse, 2 = worse, 3 = same, 4 = better and 5 = much better. For instance, the employee was asked: “Comparing previous and current procedures for handling and internal transport, how do you assess the delivery time?” To answer the question, the options of the scale mentioned above were offered. At this point it is important to highlight that the study was evaluating the respondents’ perception, starting from the assumption that they had knowledge enough because they are directly involved in the process.

5. DATA ANALYSIS AND RESULTS

After data collecting, we analyzed two quantitative models for two types of material handling. After implementation, data are interpreted again and we conclude that situation is equal or better than before the implementation.

5.1 Analysis of Vehicle-based Material Transport System

In our case, company use forklift as a main material transport vehicle. We assume that the vehicle operates at a constant velocity throughout its operations and ignore effect of acceleration, deceleration, and other speed differences that might depend on whether the forklift travels loaded or unloaded. The main factors of analysis is delivery time and available time and sub-factors of this analysis, according to survey, are loading and pickup station, travel time to drop off station, unloading at the drop off station, empty travel time of the vehicle between deliveries, availability, traffic factor, and worker efficiency. This leads us to the material handling operations, and the equation is:

Delivery cycle time [min/delivery]=time to load at load station[min]+(distance the vehicle travels between load and unload station[m]/carrier velocity[m/min])+time to unload at unload station[min]+(distance the vehicle travels empty until the start of the next delivery cycle[m]/ carrier velocity[m/min])

or

$$T_c = T_L + (L_d/v_c) + T_U + (L_e/v_c)$$

In addition, not all delivery cycles are the same. Originations and destinations may be different from one delivery to the next, which will affect the L_d and L_e in the equation.

The possible time losses include availability, traffic congestion, and worker efficiency. According to these factoras we can evaluate equation for available time and it will look like this:

$$\text{Available time} = 60 * \text{Availability} * \text{Traffic factor} * \text{Worker efficiency}$$

or

$$AT = 60 A F_t E_w$$

Now, when we determine these factors, we can evaluate rate of delivery which will be:

$$\text{Rate of delivery} = \text{available time} / \text{total delivery cycle time}$$

The number of vehicles, namely forklifts, needed to satisfy a specified total delivery schedule can be estimated by:

$$\text{Number of vehicles} = \text{total delivery requirement} / \text{delivery rate per vehicle}$$

These are the equations which we evaluate and implement into company's material handling system. It results with high worker's satisfaction, since they realize which factors they need to consider and control in order to improve performance of material handling system.

5.2 Analysis of Conveyor System

There are two types of conveyor systems: single direction conveyors and continuous loop. In our case we will consider only single direction conveyor and analyze the factors which define material flow rate in this system. Consider this case we determined that materials are loaded at one end and unloaded at the other. It leads to the fact that the time required to move materials from load station to unload station is given by:

$$\text{Delivery time} = \text{length of conveyor} / \text{conveyor velocity}$$

According to these factors we find out that material flow rate is determined as:

$$\text{Material flow rate [parts/min]} = \text{conveyor velocity} / \text{center-to-center spacing of materials on the conveyor [m/part]}$$

6. CONCLUSION

Because of the often complaints on failures in service and also low speed in material handling, the company was willing to innovate and improve internal processes that could increase efficiency of service. The goal was to evaluate two models and analyze them in term to determine the equations which will help to company to have more detailed and concrete system which will improve the performance of the material handling management.

With the new system implementation we analyze two types of material transport systems and evaluate mathematical model for each of them which were supported with the evaluated factors. Models are compatible with the company's environment and improve performance of material handling management in every sense. By implementing these models efficiency of the management was improved and material handling operations are controlled better and with more professionalism.

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Discrete Wavelet Transformation (DWT) application for low frequency electromechanical oscillations identification and analysis in Electric Power Systems

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ABSTRACT

Frequency is used as a status indicator in Electric Power Systems in terms of the balance between electricity production and consumption. Deviations of rated frequency (50 or 60 Hz) indicate that it came to a higher/lower electricity production or consumption, usually in the form of transmission, production or consumption unit blackouts. Stability problem and electromechanical oscillation problems are always present in Power Systems. As a Power System response to any disturbance in a grid electromechanical oscillations occur, which can be damped or undamped with constant or growing magnitude, with magnitude values which may cause disturbances in system operations. This paper deals with low frequency oscillation identification and analyses problem in Power Systems which are processed by using the Discrete Wavelet Transformation (DWT). Disturbances are simulated and analyzed in symmetric Kundur Test System. Simulation is performed on two signals by using digital filters with focus on Intra-Area Mode oscillations (0.4 – 1 Hz). For low frequency electromechanical oscillation analyzes software package *MATLAB* is used, specifically program code for Discrete Wavelet Transformation (DWT). The first part of calculation is done in *PSAT Toolbox (Power System Analysis)*, the results and the output signals are analyzed in “*wavemenu*” toolbox, while “*tfagui*” toolbox is used for reading of the dominant frequency. The conclusions indicate on great advantages of DWT application for monitoring and identifying Power System parameter changes, in regard to standard mathematical tools for signal analysis and processing.

Key words: Discrete Wavelet Transformation (DWT), electromechanical oscillations, details, approximations, signals, frequency, Electrical Power System

Introduction

A. Low frequency electromechanical oscillations

Any disturbance to the system, even minor, will lead to the system's generators oscillating about their target operating point. Oscillations occur when load changes, when lines are switched, when generators trip, and when faults occur.

An oscillating power system can be visualized with the help of an equivalent system. Figure 1 is the mechanical equivalent of a power system. The weights represent generators while the rubber bands represent transmission lines. The more massive the rotating components of the generator, the larger the weight. The higher the voltage (and greater the capacity) of the transmission line, the thicker the rubber band. A disturbance to the power system is equivalent to tugging on one of the weights (generators) or cutting one of the rubber bands (transmission lines). Once a weight is tugged or a rubber band cut, the entire system will enter into a period of rhythmic oscillations, [1].

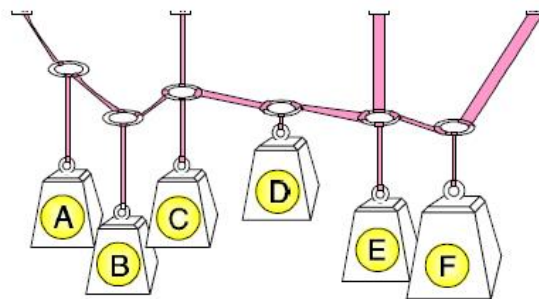


Figure 1 Mechanical equivalent of electromechanical oscillations, [1]

Oscillations are hardly an unusual event. The power system will naturally enter periods of oscillation as it continually adjusts to new operating conditions. Usually, oscillations amplitude and their duration is short.

B. Definition of Oscillations and Triggering Events

The power system normally oscillates at a frequency of 50 Hz. When unwanted oscillations occur it is not only the MW and MVAR that oscillate. Voltage, current, frequency, and apparent impedance will also oscillate at frequencies other than 50 Hz. This type of oscillation may be damaging to the power system, [1].

Oscillations require some initiating or triggering event to start. This event may not be noticeable. For example, a gradual increase in system load level may trigger an oscillation. Power system equipment, such as large motors or high voltage direct current (HVDC)

systems may trigger an oscillation, [1]. When oscillations appear on the power system, they will typically be at much lower frequencies than the standard 60 Hz power system frequency. Typical oscillations may vary from 0.05 Hz to 3 Hz. The frequency of the oscillation will depend on what portions of the system are oscillating. For example, the most noticeable power flow oscillations on a major 500 kV line may have a frequency of 0.3 Hz, while oscillations confined to a single generating unit may be in the neighborhood of 2 Hz, [1].

Figure 2 illustrates a simple power system consisting of one generator connected to a much larger power system.

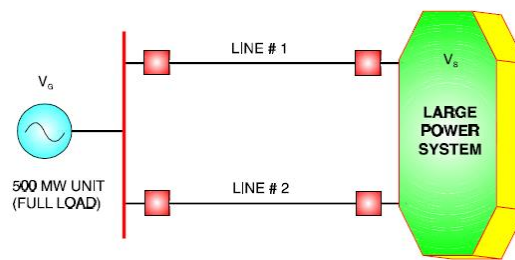


Figure 2 Test system example, [1]

Initially, the generator is feeding power to the larger system over two transmission lines. Assume that one of the lines is suddenly opened. When the line is opened it causes a substantial shock to the system. Suddenly the generator has lost one-half of its transmission path. To illustrate the creation of a power oscillation we will step through the response of the generator to this system disturbance. These steps are very general in nature but are representative of how most generator oscillations develop:

1. A change takes place in the power system,
2. The turbine/rotors of the system generators change their rotating speeds (differently from the synchronous rotating speed) in response to the system change,
3. The velocity change to the generator turbine/rotors leads to a change in system angle spreads,
4. When the angle spreads change, the electrical power outputs of the system generators change,
5. When the power outputs of the system generators change, the turbine/rotors of the generators change rotating speed again and an oscillation begins,
6. The generators will oscillate about a target operating point until system positive damping reduces the amplitude of the oscillations, [1].

C. Oscillation types

We stated previously that individual generators typically oscillate at frequencies varying from 0.75 Hz to 3 Hz. A power system is composed of many generators and many transmission lines. When the effect of all the different system components are accounted for, the range of typical system oscillations extends from approximately 0.05 Hz to 3 Hz.

The frequencies above 1 Hz are relatively high frequency oscillations and are normally well damped by the power system. The frequencies below 1 Hz are relatively low frequency oscillations. These are the frequencies that may cause system problems. Low frequency oscillations may be undamped or negatively damped, [1].

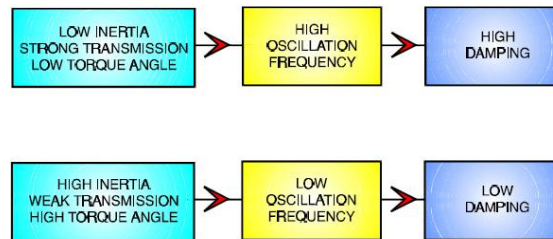


Figure 3 High and low frequency oscillations, [1]

At anyone time there may be several distinct oscillations occurring in a power system. Different frequency oscillations may occur simultaneously.

To simplify our description of the frequencies at which the power system oscillates, the typical frequencies of oscillations are divided into four modes of oscillations. Each mode covers a range of frequencies. This paper will be focused onto Intra-Area Mode oscillations (from 0.4 Hz to 1 Hz). Range division of the frequency oscillations:

- *Inter-Area Mode* (0.05 do 0.5 Hz),
- *Intra-Area Mode* (0.4 do 1 Hz),
- *Local Mode* (0.8 do 2 Hz),
- *Intra-Plant Mode* (1.5 do 3 Hz).

Oscillation frequencies from 0.05 Hz to 0.5 Hz are called the *Inter-Area* mode of the oscillations. These low frequency oscillations are formed when entire power system oscillate with respect to other power systems. The oscillations cause the two power systems to exchange power in cyclical fashion at a frequency typically ranging from 0.05 to 0.5 Hz. *Inter-area* mode oscillations are dangerous as the power system is not adept at providing natural damping for low frequency oscillations, [2].

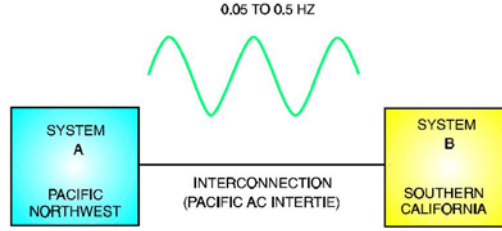


Figure 4 *Inter-area mode of oscillation, [1]*

An example of the occurrence of the inter-area mode of oscillation is the Pacific Northwest oscillating against Southern California. These two large power systems are connected with a relatively weak transmission path (Pacific AC 500kV Intertie). In the late 1960's and early 1970's inter-area mode oscillations were very noticeable on the transmission lines connecting these two systems. These oscillations had a frequency of approximately 1/3 Hz.

Anytime two large power systems are interconnected via a relatively weak transmission path, those systems are at risk of inter-area mode oscillations. Experience has shown that in order to safely interconnect two large systems, the connecting lines should, at a minimum, have a capacity of at least 10% of the smaller system, [1].

I. WAVELET TRANSFORMATION

Wavelets are short-term oscillating waveforms with mean value equal to zero and amplitude which is rapidly declining to zero. They are especially suitable for non-stationary signal analysis. Unlike DFT (Discrete Fourier Transformation) analysis, by using Wavelet, simultaneous signal analysis in time and frequency domain with different resolutions can be achieved. That makes this method very attractive for disturbance analysis in the field of power quality. Wavelets are used when it is not so important to know the frequency of voltage or current waveform disorders, but their timelines. Wavelet analysis is a technique of breaking function on multiple components which correspond to different frequency bands. In this way it is possible to consider every component separately. The idea has existed since XIX century, when Joseph Fourier has shown that signal can be represented by superposed sine and cosine functions, setting the fundamentals of famous Fourier analysis. Unlike Fourier Transformation which can offer only information about frequency, Wavelet transformation gives time and frequency information about the considered signal. Wavelets are obtained by scaling operations and by shifting a special function called basic Wavelet (*mother Wavelet*), [3].

A. Discrete Wavelet Transformation

Discrete Wavelet Transformation (DWT) is a digital recording of continuous Wavelet Transformation (CWT). It uses digital filters of different limit frequencies with which analyze signal on different scales and frequencies. So for discrete signal decomposition, filter cascade is used. This construction is called Wavelet decomposition tree, shown on figure 5.

Using the decimation by two on the output of LP (low pass) and HP (high pass) filter, it comes to scaling of Wavelet by two for the next level. Higher resolution in time domain is obtained with higher band frequency (wider bands), while lower resolution in time domain is obtained with lower band frequency (narrower bands). DWT uses two digital filters:

- Low pass filter, $h(n)$, defined by scaling function $\phi(t)$,
- High pass filter, $g(n)$, defined by Wavelet function $\psi(t)$.

DWT algorithm:

Original digital signal $x(n)$ with a frequency range $0-F_s/2$ (F_s – sampling frequency) is passed through low pass and high pass filters. Every filter passes half of a frequency spectrum of the original signal. Filtered signals are under sampled, by removing every other sample.

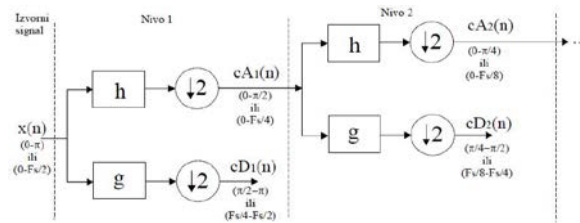


Figure 5DWT algorithm: Signal decomposition, [4]

Decomposition on one level cuts the resolution time in half, while frequency resolution is two times higher. Passing the signal through high pass filter, maximum signal frequency is half lower. Considering that Nyquist criterion is met, to reduce the redundancy (number of samples) a sampling frequency limit is taken according to criterion, i.e. sampling frequency is twice reduced. Sample rejection process changes the scale. This procedure can be performed until two samples are left, [3].

Signal reconstruction is shown on figure 6:

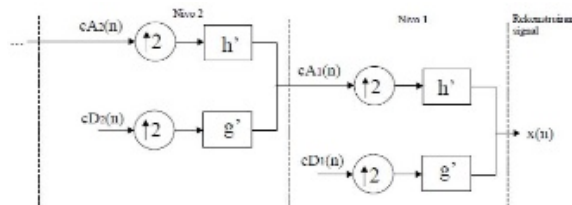


Figure 6Signal reconstruction, [4]

Over the coefficients of each level interpolations are performed firstly (between each two samples new one with zero value is added), and then passed through a synthesis filters: approximation coefficients $c_{Ai}(n)$ are passed through a low pass filter $h'(n)$, and detail coefficients $c_{Di}(n)$ through a highpass filter $g'(n)$. Outputs of these filters are added up, and the result represents approximation coefficients of lower level. Synthesis and analysis filters make quadrature mirror filters (QMF), [2].

II. METHODOLOGY AND USED DATA (TEST SYSTEMS)

Wavelet transformation is used to analyze the problem of low-frequency electromechanical oscillations because it is most suitable for localization and classification of changes in non-stationary signal.

In the analysis of low frequency electromechanical oscillations software package MATLAB [5] is used, and program code for a Discrete Wavelet Transformation (DWT). The first part of the simulation is done in the PSAT toolbox (Power System Analysis Toolbox), and then the output signals are analyzed in the „wavemenu “toolbox.

Disturbance is analyzed in the Kundur¹³⁶ test system, which is shown in next figure:

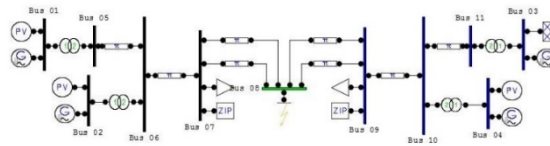


Figure 7 Analyzed test system

It is obvious that the observed system is symmetric, or that the subsystem on the left side is symmetrical to the subsystem on the right side and it consists of four generators, which deliver power to the buses. This is a standard system for testing the low frequency oscillations which represents two interconnected areas. Our task is to perform a simulation of disturbance, which happened in fifth second of the simulation, on bus number 08, and then we will monitor and analyze generator frequency change and line 08-09 power change.

Afterwards, the DWT will be applied to output characteristics of machine frequencies and compared with each other by using the tools of the software package MATLAB, [5].

III. RESULTS AND ANALYSIS

After the simulation, the following results were obtained:

¹³⁶Dr. PrabhaKundur is an engineer who had a great contribution to modern electric power analysis, in respect of modeling and management techniques that improved the reliability of electric power systems.

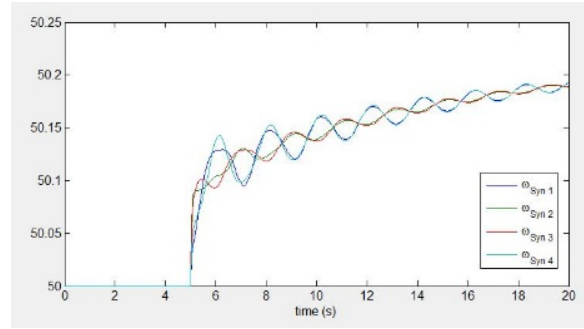


Figure 8Generator frequency change as function of disturbance

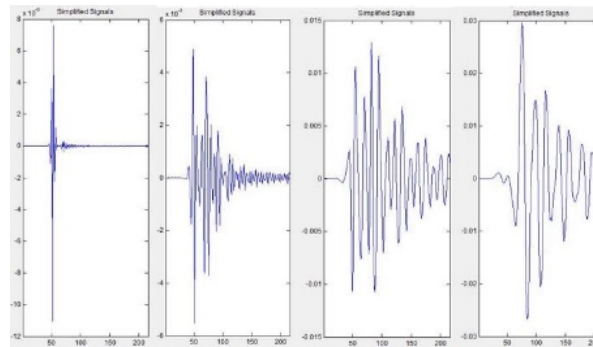


Figure 9Unit 1 (D1, D2, D3, D4)

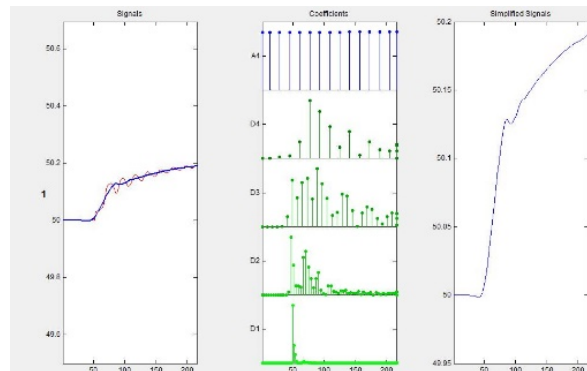


Figure 10 Generator 1, A4

Figure 8 shows oscillations of the 4 units, i.e. frequency oscillation as function of time. Figure 9 shows the details to the fourth degree of the first unit signal. Detail 1 (D1) represents the initial change of unit frequency appeared in the initial moments immediately after the disturbance and has a transiently damped character. Detail D2, D3 and D4 amplitudes are maximum at the time of disturbance, afterwards they are slightly damped. The dominant frequencies of the details D2, D3 and D4 are approximately the same for all units.

The dominant frequency values will be read by using the “tfagui” toolbox of software package MATLAB, [5]:

- D1 – 3 Hz,
- D2 – 1.5 Hz,
- D3 – 0.9 Hz,
- D4 – 0.5 Hz.

The details effect on the main signal is manifested as a slightly damped signal oscillation. When the approximation is considered, it shows that the signal increases from 50 to 50.2 Hz, and the right graph in figure 10 represents a low frequency component and trend of analyzed phenomena. As a final result, frequency increase of 0.2 Hz appears, which represents dangerous undamped low frequency oscillations in the system.

For the analysis and display of power oscillations on the disturbed line (between bus 08 and 09) PSAT and “tfagui” toolbox in software package MATLAB [5] will be used.

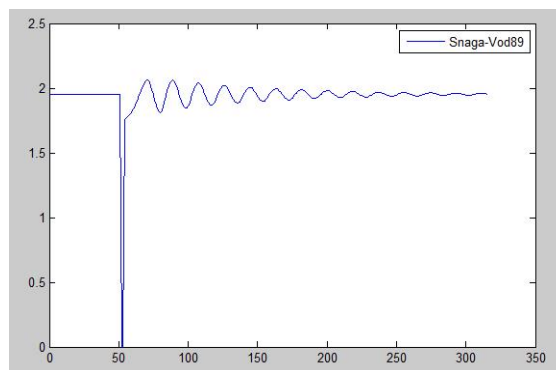


Figure 11 Display of power (frequency) oscillations of the disturbed line

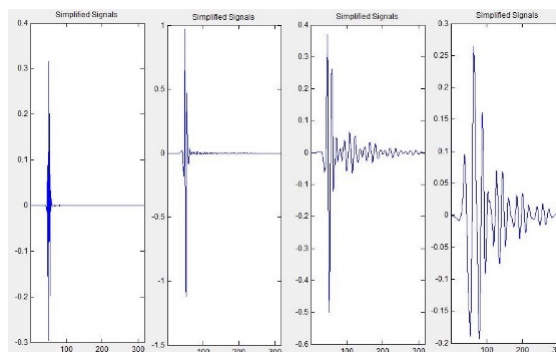


Figure 12 Signal details

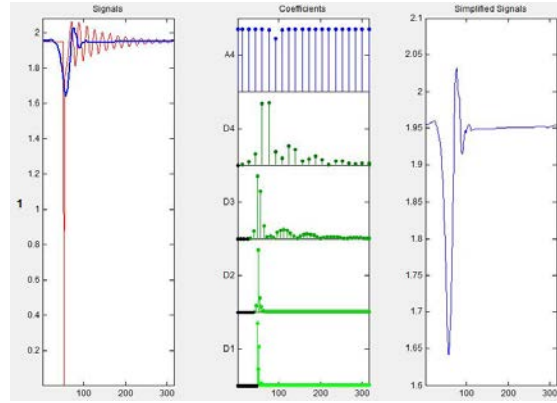


Figure 13Power changes approximation A4

For reading the dominant frequency each of the details (D1, D2, D3, and D4) “tfagui” toolbox in software package MATLAB [5] is used. Next figure shows the “tfagui” toolbox where Fourier transformation is performed on details and where dominant frequencies are determined:

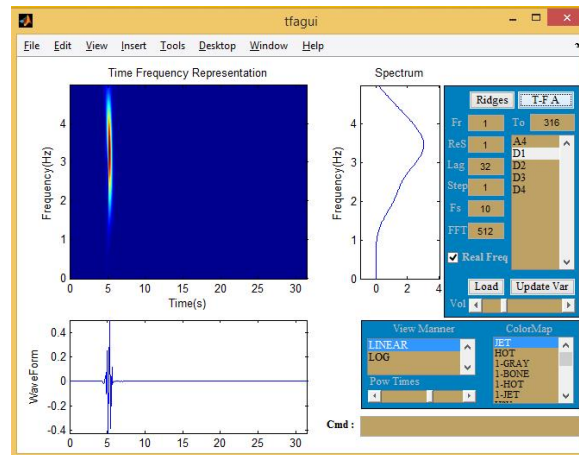


Figure 14“tfagui” toolbox and determining dominant frequencies of the detail D1

Figure 13 shows a decrease of transmitted power through the line at a time of disturbance, as well as oscillatory damped convergence to steady state. Approximation A4 represents the trend of power change in this case too, while the details represent low frequency oscillations. Detail 1 (D1) represents the initial line power change appeared in the initial moments of a disturbance and has a transiently dumped character. Detail D2, D3 and D4 amplitudes are maximum at the time of disturbance, then they are slightly dumped.

Dominant frequencies of the details (determined with“tfagui” toolbox):

- D1 – 3.5 Hz,

- D2 - 1.8 Hz,
- D3 - 0.8 Hz,
- D4 - 0.3 Hz.

CONCLUSION

This paper presents the basics of electromechanical oscillations with a special focus on the Intra-Area oscillations, as well as the Discrete Wavelet Transformation application for identifying and analyzing low frequency electromechanical oscillations.

On the basis of analysis conducted, it can be concluded that the Discrete Wavelet transformation (and Wavelet transformation generally) is a useful tool for the lowfrequency and highfrequency oscillation analysis which can occur in the power system due to different operating modes, as well as in the system blackout.

Analyzed test system is used as an example of low frequency oscillations, where the advantages of DWT can be shown (even in relation to the DFT – Discrete Fourier Transformation), as the decomposition of the complex frequency phenomena (occurrence of higher harmonics) by using the principle of multiresolution. Tests results show that this technique is capable of identifying the disturbances in power systems, detection of the dominant electromechanical oscillatory mode and oscillatory mode character.

Due to its advantages in regard to standard mathematical tools for the analysis and signal processing, it is expected for the Wavelet transformation to be used in a wide variety of systems for monitoring and identifying the system parameter changes.

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Aplication of tumor-associated antigen CA 125 at the Architect i2000 SR analyzer

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ABSTRACT

Biochemical changes in malignant human diseases result in qualitative and quantitative changes of various constituents of body fluids. Tumor markers produce cells affected by malignant process and then released into the blood. The aim of this research is the application of tumor antigen CA 125, CA 15-3, CEA and CA 19-9 in the analyzer Architect i2000 SR, determine the precision of the method and compare the results of the diseases according to the benign and malignant diagnosis and age. During this retrospective-descriptive study we examine clinical history data of disease at 100 patients from Oncology Department Clinical Center University of Sarajevo. Architect i2000 SR analyzer for determination of tumor markers used specific microparticle chemiluminescent technology (CMIA-Chemiluminescent Immunoassay microparticle). CMIA reaction is a series of interactions between an analyte present in a human sample (blood) and the reactant. For precision determination of CMIA method was applied control serum for the high, medium and low control where the coefficient of variation was between 4.75 and 5.97%, which is an indicator for very good precision of the method. The high value of CA 125 has been demonstrated in 27% of patients with the diagnosis of ovarian cancer, 7% in benign ovarian tumors, 18% with cystic ovaries. Elevated levels of CA 125 were shown in 11% of patients with suspected breast cancer. Between CA 125 and CEA is not positive correlation ($R = 0.005$), nor between CA 125 and CA 15-3 ($R = 0.025$). The correlation coefficient between CA 125 and CA 19-9 is $R = 0.257$ indicating a slight correlation of these markers. There was established positive correlation CA 125 with malignant diseases and negative correlation CA 125 with age in women with ovarian cancer what indicates that with increasing age leads to a decrease in a value of CA 125.

Key words: 125 tumor antigen, tumor marker, CA 125, ovarian cancer, chemiluminescent immunoassay

INTRODUCTION

General characteristics and clinical evaluation of tumor markers

According to the definition adopted at the fifth International Conference in Sweden (1988), tumor markers are defined as a substances that are produced in tumor cells, secreted in body fluids, and quantitative measured in non- invasive *in vitromethod* procedures.

Although tumor markers are mainly products of malignant cells, they are not strictly specific for malignancy, since increased values of tumor markers can be excepted in benign diseases, cystic changes, inflammation, and in some physiological conditions. According to the origin of the molecules, tumor markers are divided into six groups (**Table 1**) (14,17).

There is about one hundred known tumor markers, and each marker is specific for a particular tissue (**Table 2**). In this study, we investigated the CA 125, CEA, CA 19-9, and CA 15-3 tumor markers.

Table 1. Distribution of tumor markers by origin

Oncofetal Proteins	AFP ¹³⁷ , CEA ¹³⁸ , TPA ¹³⁹ , SCC ¹⁴⁰
Carbohydrate Antigens	CA 15-3, CA 125, CA 19-9, CA 19-5, CA 50, CA 72-4, CA 242 ¹⁴¹
Enzymes	NSE ¹⁴² , isoenzymes of alkaline phosphatase, lactate dehydrogenase, CK-BB ¹⁴³
Hormones and hormone receptors	HCG ¹⁴⁴ , calcitonin, gastrin, growth hormone, ACTH, receptors for estrogen and progesterone
External Proteins	B2-microglobuline, immunoglobulins, C-peptide
Genetic Markers	Oncogenic growth factors, growth factors receptors, signaling protein transcription factors, tumor suppressor genes (p-53, p-16, BRCA 1)

Table 2. Tumor markers specific to certain tissues

<i>Cancers</i>	<i>Tumor markers</i>
Gastrointestinal Cancer	CA 19-9, CA 50, CA 242, CEA
Stomach Cancer	CA 72-4, CEA, CA 19-9
Pancreatic Cancer	CA 19-9, CEA

¹³⁷ Alfafetoprotein

¹³⁸ Carcinomaembryonicantigen

¹³⁹ Tissue peptide antigen

¹⁴⁰ squamous cell carcinoma antigen

¹⁴¹ Blood group antigens

¹⁴² Neuro-specific endolase

¹⁴³ Creatine kinase

¹⁴⁴ Human chorionic gonadotropin

Liver Cancer	AFP, CEA
Breast Cancer	CA 15-3, CEA, CA 27-29, cathepsin D, MA 552, estrogen receptor, progesterone receptor
Ovarian Cancer	CA 125, CEA, AFP, hCG, CA 19-9
Testicular Cancer	AFP, hCG, CEA
Uterine Cancer	hCG, CEA
Prostate Cancer	PSA, FPSA, PAP
Kidney Cancer	M2-PK, pyruvate kinase isoenzyme (tip M2)
Cancer of the thyroid gland	Tg (differential carcinoma), CT (medullar carcinoma)
Lung Cancer	Cyfra 21-1, NSE, CEA, SCC
Melanoma	S100 B, tyrosinase
Leukemia and Lymphoma	B2-mikroglobin, ferritin

Carcinoma Antigen 125 or CA 125 is a glycoprotein with molecular weight of 220 kDa. It was discovered in 1981 in fetal tissue and epithelium of bronchi and bronchioles of healthy individuals. By its chemical structure, this glycoprotein *tumor* marker or *biomarker* is obtained by hybridization of mouse spleen cells immunized by human ovarian carcinoma cells. CA 125 recognizes the monoclonal antibody OC 125, which was developed against the OVCA 433 cell ovarian cancer in humans. CA 125 is a quite sensitive and specific marker because in healthy individuals it is measured in a concentration of 1% and about 6% in benign healthy conditions. It can be normally found in the serum, milk, cervical mucus, semen. It is very useful in the diagnosis and monitoring of diseases such as ovarian cancer, cancer of fallopian tubes, cervix cancer, cancer corpus uteri, and elevated levels of CA 125 can be also measured in other condition such as carcinoma of pancreas, breast carcinoma, lung and gastrointestinal tumors. In women with ovarian cancer diagnosis, the value of CA 125 can be increased up to 80% (2, 5, 10, 11). The values of CA 125 may increase in patients with benign diseases such as acute pancreatitis and peritonitis, often values of CA 125 grows with benign gynecological disease such as cysts or inflammation or pro-physiological conditions such as menstrual cycle or pregnancy (12, 18). CA 125 sensitivity reaches up to 94% and specificity reaches up to 89% in CA 125 diagnostic procedures. In order to establish the correct diagnosis, there are often applied secondary markers such as CEA or ca 19-9. Determination of serum values of CA 125 is questionable in pregnancy and reason is that the value of CA 125 may be much higher than that in malignant change, for example, the value of CA 125 at the end of the first trimester of pregnancy reached the highest value (16-

268 U/ml). Attempts to implement screening CA 125 in the early detection of ovarian cancer did not show good results. In women less than 45 years old, increased levels of CA 125 in more than 95% of cases were the result of other pathological conditions and have no diagnostic significance in the early detection of ovarian cancer. The level of CA 125 in healthy individuals is in the range of 35 U/ml, and increases in proportion to the physiological condition, benign and other diseases. Many studies have shown that less than 50% of women suffering from the first stages of ovarian cancer have elevated CA 125, that makes this marker lose significance in the early ovarian cancer detection. On the other hand, monitoring of CA 125 in advanced ovarian cancer is irreplaceable and has great significance in the clinical management of patients. Cloning and expression of CA 125 opens the possibility of better understanding the features of CA 125 in normal and malignant cells, for this purpose it is a large number of studies on the MUC16 gene wherein the CA 125 coding is performed (9).

Cancer antigen CA 19-9 is glycoprotein molecule that shows significance in diagnosis of pancreas and bile duct tumors. Increase level CA 19-9 may occur in gastric cancer, colorectal cancer, and often is used as an additional diagnostic marker for ovarian cancer (14, 17, 18).

Carcinoma-embryonic antigen CEA is glycoprotein molecule synthesized in the cell wall, located on the cell surface, and hence excreted in extracellular fluids. Elevated levels of CEA in serum is commonly found in colorectal cancer, stomach cancer, breast cancer, lung cancer, pancreatic cancer, esophagus cancer etc, where it occurs as a product of the malignant cells (19).

Cancer antigen CA 15-3 is glycoprotein molecule, a particular clinical attention has in monitoring breast cancer. Elevated levels of this marker can be measured in ovarian cancer, hepatitis, cirrhosis, pancreatitis, pneumonia (14, 17, 18).

MATERIAL AND METHODS

This study included data from history diseases of 100 middle-aged and elderly patients from Clinical Center University of Sarajevo. The control group consisted of 30 healthy subjects. This study includes the value of CA 125 and other markers; CEA, CA 19-9, CA 15-3. The period of data collection for this retrospective-descriptive, comparative analysis covers the period of three months.

During the research subjects were divided into two groups on the basis of referral diagnoses. Referral suspicious diagnosis were some benign and malignant disease. The patients were divided into several groups in relation to the diagnosis and to those with ovarian cancer, breast cancer, benign ovarian tumor, ovarian cysts, CRF, renal cancer, colorectal cancer.

Determination of CA 125, CEA, CA 15-3, and CA 19-9 tumor marker was conducted in the laboratory of Toxicology and markers, organizational units for clinical chemistry and biochemistry Clinical centre University of Sarajevo. Samples were applied to the

autoanalyzer Arcitect i2000 SR of *Abbot Technologies* company. Calibrations were done prior to analysis of samples, according to the manufacturer's recommendations. Statistical analysis of results was performed in Excel 2010 and the results are presented in the form of tables and graphs.

Normal values of observed tumor markers:

- CA 125; 0,00-35,0 U/ml
- CA 19-9; 0,00-37,0 U/ml
- CEA; 0,00-5 µg/ml
- CA 15-3; 0,00-31,3 U/ml

Sample preparation

To determine the concentration of CA 125, CEA, CA 15-3, and CA 19-9, we used blood samples obtained from the cubital vein in tubes with gel or resin as an anticoagulant. Other anticoagulants should not be used for Architect CA 125 test. The blood was stood at room temperature for 30 minutes. Centrifugation of the samples was performed for 15 minutes at 3000 rpm/min. After centrifugation was done, serum separation was performed in serum separator tubes. Serum samples are collected in a manner to avoid hemolysis, with fibrin and erythrocytes removed from the samples. Heterophilic antibodies in human sample can react with immunoglobulins of the reagent and thus interfere with immunoassays. Immunoglobulins from reagents for CA 125 are designated as 2K45, 7K68 with CEA, CA 15-3 in 2K44 and 2K91 with CA 19-9. Patients who are routinely exposed to serum animal products containing these antibodies, they can not be taken for analysis of these antigens (22, 23, 24, 25).

Methods for determination of CA 125, CEA, CA 15-3, and CA 19-9 in Arcitect i2000 SR analyzer

On the Architect i2000 SR autoanalyzer was performed application and determination samples for measuring concentration of tumor marker CA 25, CEA, CA 15-3, and CA 19-9. Assay on Architect i2000 SR is used chemiluminescent microparticle technology (CMIA; Chemiluminiscent microparticle Immunoassay) that is used for the quantitative determination of tumor markers in human serum or plasma. The reactants necessary for the immunoassay are:

- Paramagnetic microparticles associated with host molecules
- Compound with attached acridinium
- Pretrigger and trigger solutions

CMIA reaction is represented in a series of interactions between the analyte present in the sample and reactant. The reaction contains two steps:

1. First step represents mixed complex microparticles with bound antibodies with human sample in the reaction tube. The mixture was incubated, and the analyte (antigen)

which is present in the human sample binds to the appropriate host molecules (antibodies) on the surface of the microparticles and formed immune complex. Magnet attracts paramagnetic microparticles with bound analyte to the wall of the reaction tube. The system for rinsing after the reaction mixture is washed, thereby removing unreacted material and provides a continuation of the process.

2. Pipetor pipetted chemiluminescent complex with bound acridinium. The complex binds to the immune complex and thus completed the reaction mixture. The mixture is again incubated and then washed to remove unbound material.

Adding pretrigger solution of H₂O₂, the optical system in Architect i2000 SR begins reading results in background followed by addition of NaOH. By adding NaOH, H₂O₂ transforms from acidic to alkaline medium, and akridium exceeds the N-metilakridon that under the action of peroxide and alkaline solutions is subject to oxidation processes that results with light emission. An optical system measures the chemiluminescent emission of light in the specified time interval to determine the quantity of analyte. Induced chemiluminescent reaction is measured in RLU (Relative Light Units). The amount of the measured relative light units is directly proportional to the value of the analyte in the sample (22, 23, 24, 25).

RESULTS

Quality control and precision of the method is the first step that has been done before application samples for determination of CA 125. There was apply 19 control serum for Control H (High Control), 31 for the Control M (Medium Control) and 34 for Control L (Low Control). The precision of the method according to the coefficient of variation (CV) was in the range of 4.75% to 5.97% which is an indication of a good precision of the method (Table 3)

Table 3. Precision of the method for determination of CA 125 on Analyzer Architect i2000 SR

	<i>Control L</i>	<i>Control M</i>	<i>Control H</i>
X (ng/ml)	37,79	293,24	647,17
S.D (ng/ml)	3,57	35,18	61,69
K.V (%)	5,97	5,67	4,85

According to the referral diagnosis of the respondents, in this study there was established higher percentage values of malignant (53%) disease compared to benign (47%) (**Figure 1**).

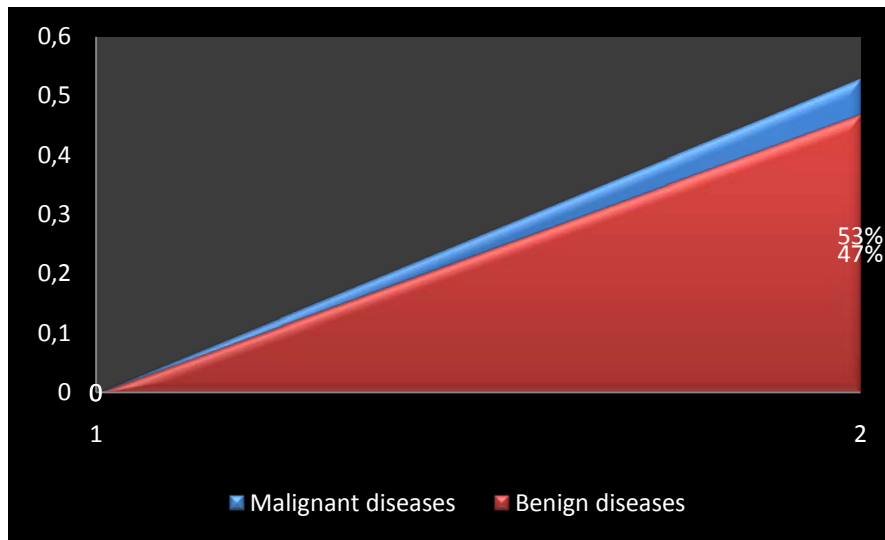


Figure 1. Distribution of patients as compared to benign and malignant diseases

The refferal diagnosis of suspect malignancy were ovarian cancer, breast cancer and colorectal cancer, and for benign;benign ovarian tumor, ovarian cysts, CRF and renal tumor. The average (%) distribution of individual diseases for total sample that includes malignant and benign diseases is shown in Table 4.

Table 4.The average (%) distribution of patients as compared to benign and malignant diseases

According to the refferal diagnosis	Number patients	of Prevalence of disease in%
Ovarian Cancer	29	29%
Breast Cancer	11	11%
Benign Ovarian Tumor	7	7%
Ovarian Cysts	18	18%
Chronic Renal Failure (CRF)	14	14%
Kidney Tumors	8	8%
Colon Cancer	13	13%

The control group consisted of 30 healthy subjects whose average value of tumor markers CA 125, CEA, CA 19-9, and CA 15-3 are shown in Table 5.The mean values of tumor markers in patients with the diagnosis of benign and malignant diseases are presented in Table 6.

Table 5. Average values of tumor markers for the control group

<i>Tumor Markers</i>	<i>Control Group (X)</i>
CA 125 U/ml	8,97
CEA µg/ml	3,18
CA 19-9 U/ml	15,36
CA 15-3 U/ml	14,15

Table 6. Average values of tumor markers CA125, CEA, CA 19-9, and CA 15-3 relative to benign and malignant diseases of the respondents

<i>Refferal diagnosis</i>	<i>CA 125 U/ml</i>	<i>CEA µg/ml</i>	<i>CA 19-9 U/ml</i>	<i>CA 15-3 U/ml</i>
Ovarian Cancer	609,17	9,90	43,9	11,1
Breast Cancer	48,82	4,91	20,99	96,5
Benign ovarian tumor	964,2	7,31	8,1	31,23
Ovarian cyst	14,9	2,93	4,45	3,88
CRF	87,75	17,23	23,24	26,73
Kidney tumors	63,4	7,44	26,63	21,05
Colorectal Cancer	42,31	5,87	29,67	58,94

The average values of tumor markers compared in patients with refferal diagnosis of benign and malignant disease were found to be higher than values of tumor markers in healthy control group. The average value of tumor markers showed a higher increase in the group of patients with malignant diseases in relation to the control group (**Figure 1**). By comparing the average value of tumor markers in benign diseases and the control group it was reported greater increase in the value of tumor markers in patients with benign disease (**Figure 2**). By comparing the average values of tumor markers for benign and malignant diseases reveals a higher increase in the group of malignant diseases (**Figure 3**).

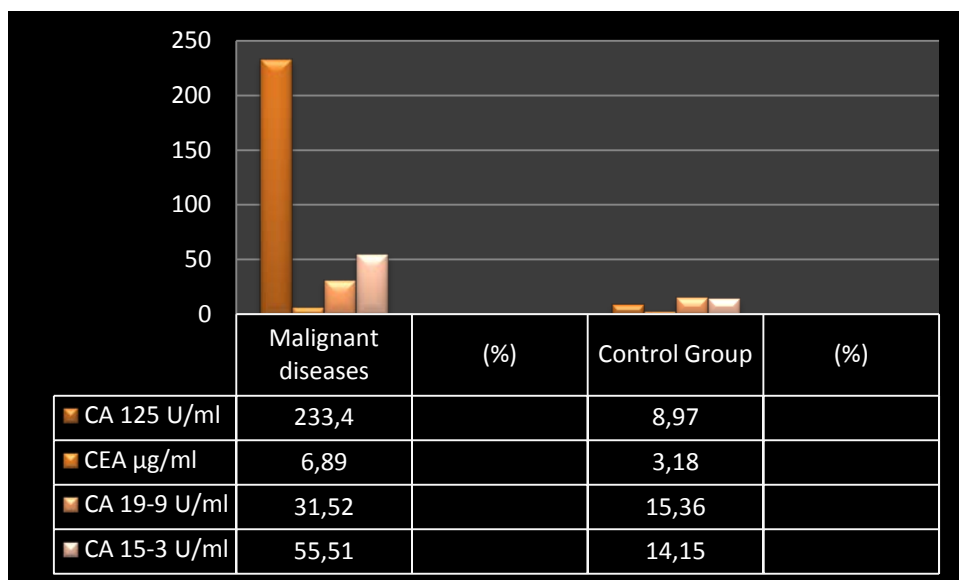


Figure 1. The average values of tumor markers compared for malignant diseases and the control group

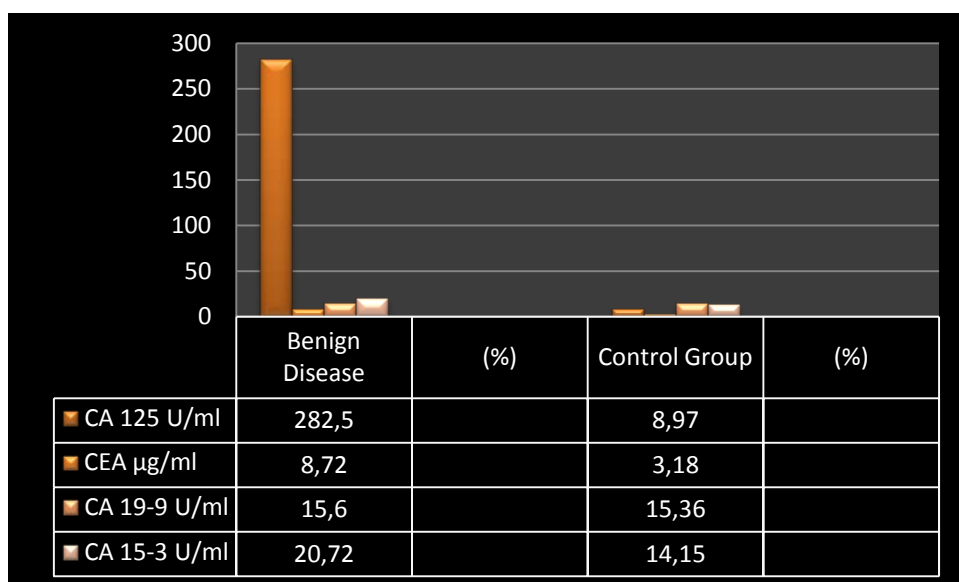


Figure 2. The average values of tumor markers compared for benign disease and a control group

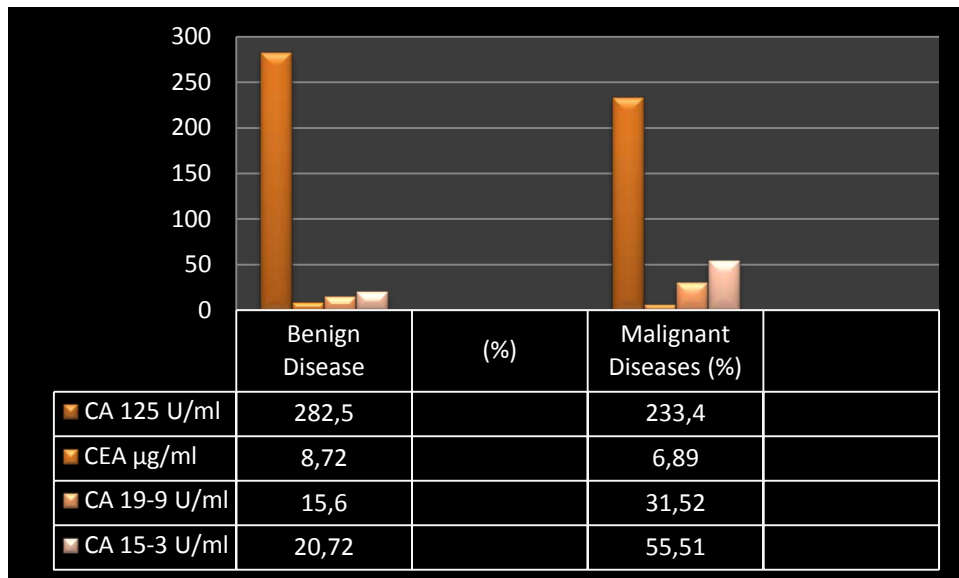


Figure 3. The average values of tumor markers compared for benign and malignant diseases

To test the relationship between CA 125 and age of the patient with ovarian cancer, we performed the division of subjects in relation to the age where we took the limit age for menopause in women was 50 years. There was 29 patients with ovarian cancer diagnosis and 22 of them were older than 50 years (> 50 y). There was shown higher average value of CA 125 in younger patients with ovarian cancer diagnosis (211,83 U/ml), while average value of CA 125 for older patients with ovarian cancer diagnosis was 149,1 U/ml (**Figure 4**).

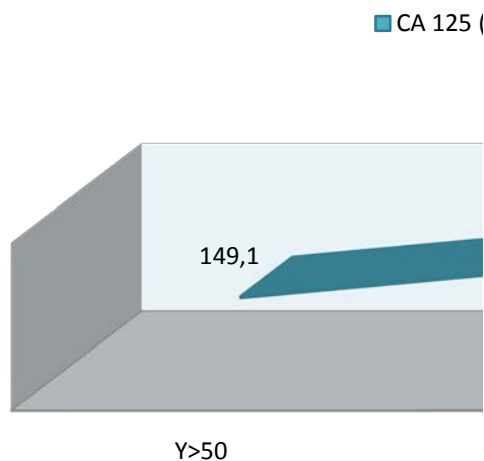
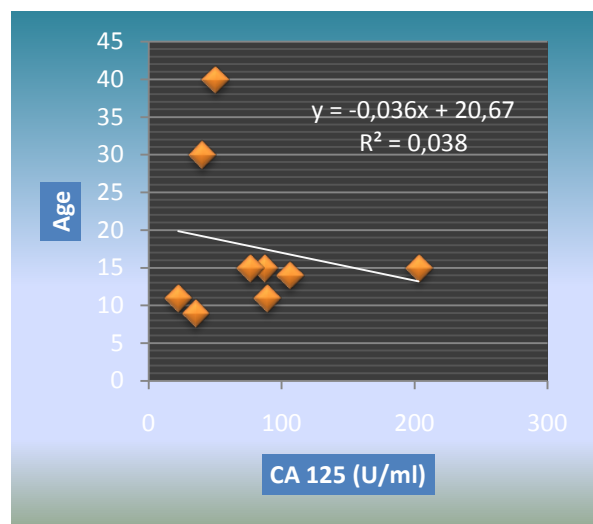


Figure 4. Distribution of ovarian cancer values CA 125 according to patients age



There was noticed negative correlation between average values of CA 125 and older patients with ovarian cancer diagnosis, $R^2 = -0,038$ (**Figure 5**).

Figure 5. Correlation analysis between CA 125 and Age

During the research, we compared the results obtained values for CA 125 with CEA, CA 15-3, and CA 19-9 to prove the possible correlation of these tumor markers according to the referral diagnosis of respondents for total sample that includes malignant and benign diseases. In the total sample, obtained correlation coefficient between CA 125 and CA 19-9 was $R^2 = 0.257$ and it represents low degree of correlation of these two markers. In our study between CA 125 and CEA was not found significant correlation or association because the correlation coefficient in this case was $R^2 = 0.005$. Correlation coefficient $R^2 = 0.025$ also indicates that there is no significant correlation between CA 125 and CA 15-3 (**Table 7**).

Tabela 7. Correlational analysis CA 125 with CEA, CA 19-9, and CA 15-3 observed in the total sample

Parametar	CEA ($\mu\text{g/ml}$)	CA 19-9 (U/ml)	CA 15-3 (U/ml)
CA 125 (U/ml)	$R^2=0,005$	$R^2=0,257$	$R^2=0,025$

Tabela 8. Correlational analysis of CA 125, CEA, CA 15-5 and CA 19-9 observed in relation to malignant and benign diseases.

Parametar	Malignant Disease	Benign diseases
CA 125 (U/ml)	$R^2=0,793$	$R^2=0,175$
CEA ($\mu\text{g/ml}$)	$R^2=0,486$	$R^2=0,051$
CA 15-3 (U/ml)	$R^2=0,214$	$R^2=0,032$
CA 19-9 (U/ml)	$R^2=0,429$	$R^2=0,143$

There was a positive correlation between CA 125 with malignant diseases $R^2 = 0.793$. Between CEA and malignant diseases was also observed positive correlation $R^2 = 0.486$, as well as between CA 19-9 and malignant diseases where the observed moderate correlation was $R^2=0,429$. Between CA 15-3 and malignancies, there was observed weak, insignificant correlation $R^2 = 0.214$. Between the observed tumor markers and benign diseases there was no observed statistically significant association ($R^2 < 0,4$) (**Table 8**)

DISCUSSION

CA 125 is widely used in the diagnosis of ovarian carcinoma, ovarian tumors and other pathological conditions of the ovaries. It is also important in the monitoring of the therapy and chemotherapy, and for monitoring the clinical course of the disease (3). It's elevated in more than 80% of cases of serous ovarian cancer. In patients with benign tumors this elevation is not so high, around 6%. In ovarian cancer, CA125 values are generally higher than 65 U / ml, however, elevated CA 125 can occur during pregnancy, in particular at the end of the first trimester, when the values may exceed of 65 U / mL. This is why increased values of the markers do not indicate specifically malignancies (17).

Diagnostic value of some tumor markers depends on analytical sensitivity and specificity of the method used to determine it, and also on the number of false positive and false negative results. Specificity results should amount to 95% and sensitivity of at least 50%. Analytical methods for the determination of tumor markers must be accurate, precise and with a minimum of interference. If the tumor marker is used for systematic monitoring of therapy, series of samples have to be taken in order to assess the efficiency of tumor markers (7). For validation of the results is necessary to determine the baseline, calculate the predictive value, the distribution of value markers and importance in the assessment of disease (6, 12, 18).

In some cases there is interference with heterophilic antibodies that could be present in the test sample; it often occurs due to the application of two different methods for determining the value of the marker in the sample. To establish a better precision in the determination of the marker two methods that have showed a good correlation are carried out; however, the results are not identical. Monitoring of tumor markers in patients needs to be conducted with the same method which should be indicated in the work (16). In the course of the study, quality control for CA 125 and accuracy have been conducted on the Architect i2000 SR autoanalyzer. According to the resulting coefficient of variation precision was good (4.75% to 5.97%).

In the study retrospective-descriptive analysis was performed in 100 patients with the diagnosis of suspected ovarian carcinoma, ovarian tumors, breast cancer and other benign breast condition. Subjects were patients admitted to KCUS in which a physician required determination of CA 125 and other additional, accompanying markers: CA 19-9, CA 15-3 and CEA.

The mean value of CA 125 in 29 patients involved in our study with the entering diagnosis of suspected ovarian cancer reached 609.17 U / ml. Elevated levels of CEA and CA 19-9 were found, while values of CA 15-3 values were slightly lower. It is known that the value of the tumor marker CA 125 are elevated also in non-malignant conditions such as pleural effusion or ascites and it is a non-specific increase in CA 125 (11). In this study, CA 125 has also shown a significant increase in benign ovarian and kidney tumor, as well as in ovarian cysts and renal insufficiency.

We had 7 patients with a diagnosis of benign ovarian tumors in which the mean value of CA 125 was 964.2 U / mL. The results show that the value of the CA 125 and CEA were

increased in benign ovarian tumor, and CA 15-3 and CA 19-9 were also increased, but in a somewhat lower value. The concentration of markers in the serum is affected by histological type and developmental stage of the tumor, while it is directly related to the progression and tumor size. CA 125 values are generally not elevated if the tumor is less than 2 cm, while in 30% of patients CA 125 values will not exceed 35 U / ml even in tumors larger than 2 cm. Significant increase in CA 125, CA 19-9, CEA and CA 15-3 was particularly pronounced in tumors the size of <4, 4.1-10 and > 10 cm, where the observed positive correlation was $p < 0.05$ (1). This can be linked to our findings where we see a higher average value of CA 125 in benign ovarian tumors.

In our study 11 patients had a diagnosis of breast cancer. They all had a lower value of CA 19-9, while the other three markers had an increased serum concentrations, especially CA 15-3, whose value increased three times more than in the reference interval, 96.5 U / ml. The study of Yerushalmi and associates showed elevation of CA 15-3 in 85% of patients with breast cancer with metastasis in other tissues and organs; elevation of CEA values were noted in 63% of these patients, while CA 125 was elevated in only 27% of patients (8).

In 18 patients with a diagnosis of cystic ovaries low values of tumor markers were observed, except for CA125, which had an average value above the reference range, 43.75 U / mL. The study by Wang et al, showed a positive correlation between CA 125 and the duration of disease, dysmenorrhea, cysts diameter and cysts wall thickness in women diagnosed with ovarian cysts. The level of CA125 in the same patients decreased to values within the reference range 6-months after the treatment (20).

In patients with renal insufficiency, out of a total of 14, 3 were women and 11 men. Calculated values of CA 125 and CEA concentration show an increase, while for CA 19-9, and CA 15-3 were observed slightly lower values. In our literature research we found a comparative study of a group diagnosed with CRF (chronic renal failure) and a control group indicated that there is an increased risk of kidney cancer, corpus uteri cancer, prostate cancer and multiple myeloma in patients with CRF. The elevated tumor markers with CRF represent an existing increased risk of developing any kind of carcinoma; however, it doesn't show the diagnostical importance in monitoring and follow-up of malignant changes in uremic patients with CRF (4).

A total of 13 patients were diagnosed with colon cancer. Values of tumor markers were high in the case of CA 125, CEA and CA 19-9. The use of these tumor markers may serve in semiquantitative discriminatory analysis classification in up to 89% of adenocarcinoma, ovarian, breast and colon cancer using antibodies. Colorectal cancer shows a good correlation with the CEA (13) which is in agreement with the results of our study where CEA for colon cancer had an average value 10 times higher than the reference value.

The use of tumor markers makes a significant contribution to the monitoring of disease progression and response to therapy (radiotherapy, chemotherapy, hormonal therapy, etc.). The criteria for the interpretation of the findings of tumor markers that would be widely accepted are as follows: increase in concentration of about 25% corresponds to disease

progression, while decrease in concentration of markers of more than 50% means partial recovery. This regulation was adopted according to the International Federation ISOBM which sets the criteria for changes in the concentration of tumor markers and response to therapy (6, 14).

In relation to age, 82.6% of the patients diagnosed with ovarian cancer were older than 50 years. The oldest patient with ovarian cancer was 75 years old and the value of CA 125 amounted to > 1000 U/ml. The youngest patient with ovarian cancer diagnose was 25 years old, and the value of CA 125 amounted to 234.7 U/mL. Average values of CA 125 in patients with diagnose of ovarian cancer were lower in older patients. According to research of Westhoff and Nguyen, low values of CA 125 in older women show great importance of early screening for ovarian cancer in this population, thus in postmenopausal women (> 50), it is essential to establish the range of values of the CA 125 with standard test method compared to healthy women and women with ovarian cancer. In order to achieve better reliability methods, it is necessary to perform a multitude of tests and evaluation of low-value markers in older women with cancerous changes and those women without cancerous changes (21). Since the values of CA 125 vary in relation to menstruation and menopause, the purpose of Nguyen study was to develop different reference intervals of CA 125 in normal women and women with altered physiological status. Average values of CA 125 in premenopausal women amounts 19.3 ± 15.6 , and in postmenopausal women the values amounts 11.7 ± 9.2 . In premenopausal women were observed statistically significant difference between CA 125 during menstruation, 21.4 ± 19.3 and luteal phases, 14.0 ± 9.1 . In normal premenopausal women, the upper limit for CA 125 should be 50 U / mL, 62 U/ml during menstruation, 51 U / mL during the proliferative phase, and 32 U / mL during the luteal phase. For postmenopausal women, the upper limit for CA 125 should not be greater than 35 U / ml for women who are still menstruating and 20 U / ml for women without menstrual bleeding. Such stratified values of CA 125 can be used in a more precise screening of ovarian cancer (15), especially in older women.

CONCLUSIONS

Elevated values of CA 125 were observed in patients with ovarian carcinoma, breast carcinoma, ovarian benign tumor, ovarian cyst, CRF, renal tumors and colorectal carcinoma. The precision of the method on the Architect i2000 SR analyzer proved to be reliable and accurate considering the resulting coefficient of variation in the range of 4.75 and 5.97. According to this research, there was established slight correlation between CA 125 and CA 19-9. There was a positive correlation between tumor markers CA 125, CEA and CA 19-9 with malignant disease. Correlational analysis showed negative correlation between CA 125 and age in women with ovarian carcinoma. Even though there was more expected of these tumor markers in the early detection of tumor changes, CA 125 still shows great significance in the diagnosis of advanced epithelial ovarian carcinoma, monitoring of therapy and chemotherapy efficacy as well as the assessment of the risk factors of malignant disease, particularly in postmenopausal women.

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Abbot Japan CO., Abbot-operation Manual Imx system REF: 2K44 for CA 15-3

Abbot Japan CO., Abbot-operation Manual Imx system REF: 2K91 for CA 19-9

REVIEW OF CONTEMPORARY METHODS FOR QUANTIFICATION OF EARTH RECENT CRUSTAL MOVEMENTS

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Large and destructive earthquakes are presumed to be the most horrifying natural disasters that may occur on Earth. They can cause big material damage and human loss. Hitherto it was considered that Earth crust stays unchanged during the large movements and quakes, however new developments and discoveries show that large earthquakes may lead to attenuation of Earth crust hence large subduction causing significant seismic and post seismic deformations reaching thousands kilometres. When observing from geodetic aspect, it may be said that such phenomenon may significantly impact global reference system by deforming positions of geodetic points on the surface of the Earth's crust. The paper shall present contemporary geodetic methods, techniques of collection and processing of data thus providing detection of wider zones of seismic activities as well as quantification of Earth surface quakes in centimetres.

1. InSAR (high spatial resolution) with potential to provide high definition of measurement accuracy and deformation during all phases of earthquake cycle
2. GNSS (high frequency of time resolution – up to 20Hz) offering potential of continued monitoring of phenomena in seismically active areas.

Researching possibilities to apply the afore-stated technologies will be implemented within the research of seismic activities in seismic area of Banja Luka region. The paper shall provide basic ideas of the planned research that will be conducted within the experimental part of the author's dissertation paper.

Key word: Earthquakes, Earth crust, global reference system, geodetic methods, InSAR, GNSS.

INTRODUCTION

Earthquakes are a major type of natural disasters, which quite often result in tragic consequences, numerous human casualties and great material destruction. The Earth is a very dynamic, constantly moving planet, primarily because of the magma found in its interior, which is never still. The moving magma causes changes to the Earth's surface, with phenomena such as uplift and subsidence, upward and downward warping, volcanic activity,

and the breaking of the Earth's crust into tectonic plates, which collide, pull away from or dive under one another, resulting in earthquakes. According to the plate tectonic theory, plate motion is one of the main causes of earthquakes. When two tectonic plates collide, tremors are caused in the Earth's crust as a result, releasing huge amounts of energy. It is possible to monitor and measure the deformations of the Earth's surface induced by strong tectonic forces by measuring surface deformations and collecting data relevant for geodynamic processes.

The Mediterranean basin, to which our country belongs, is one of the world's most active seismic zones. A good deal of the territory of the former Yugoslavia previously experienced devastating earthquakes. One such massive earthquake that struck the region in the last 45 years was the Banja Luka earthquake, which severely damaged the city infrastructure.

The aim of this paper is to show the potential of geodesy and geodetic techniques to monitor geodynamic motion and events in the area under consideration and to recognise the significance of the project involving related activities, for the purpose of developing a valid and reliable geodetic model of tectonic motions in the Earth's crust. The major advances and innovations in satellite geodesy, especially the emergence of InSAR and GNSS/GPS, are changing our perception of how earthquakes can be studied, since they provide new information about their occurrence and sources. Geodetic measurements (GNSS/GPS and InSAR) may continuously or periodically be used to collect information about land deformation. Global positioning system (GPS) networks have become the most widely used technique of this kind, with numerous applications in a range of fields, including earthquake monitoring, navigation, geodesy, etc. Many organisations and research institutes around the world use GPS for earthquake monitoring, especially now it has become such an advanced system (data collection, processing and interpretation). In 2000, Japan set up a network of 1,200 GPS stations. The network control centre receives all the recorded data, and processes and calculates daily point coordinates to ensure reliable monitoring of the motions of the Earth's crust. These data are available to the general public, and based on the measurements and information thus gained Japan has received GPS signals for 162 earthquakes between one and ninety days prior to the actual events.

InSAR technology allows us to better understand the causes of earthquakes and interseismic deformations. The strong, comprehensive links between seismology and satellite geodesy aided with new cutting-edge methods have the potential to greatly enhance our understanding of the phenomenon of earthquakes and the Earth's structure. GNSS/GPS and InSAR play an increasingly important role in the study of postseismic events. Given the precision and relative ease of use of GNSS/GPS and InSAR techniques, we may expect new revolutionary improvements to these systems in the future.

In 2011, Bosnia and Herzegovina became one of the countries which use the technology of permanent GNSS stations. Two networks of permanent GNSS stations were set up in the territory of Bosnia and Herzegovina, SRPOS, for the area of the Republic of Srpska (under the auspices of the Republic of Srpska Administration for Geodetic and Property Affairs), and FBiHPOS, for the area of the Federation of Bosnia and Herzegovina (under the auspices

of the Federation of Bosnia and Herzegovina Administration of Geodetic and Property Affairs). The two networks are fully synchronous and cover the total area of Bosnia and Herzegovina with the signals of 34 permanent GNSS stations. The control centres are located in Banja Luka and Sarajevo, and they exchange the data received by a number of selected GNSS stations, thus ensuring the two networks are both geometrically configured as necessary. The implementation of the BiHPOS project has meant a major advancement in the area of use of satellite measurement techniques in the region, permitting the local geodetic authorities to monitor geodynamic events and develop an accurate reliable geodetic model of tectonic motions of the Earth's crust based on continuous GNSS/GPS monitoring.

AREA UNDER STUDY

The territory of Bosnia and Herzegovina is part of a zone of high seismic activity. It is located in an area of high tectonic instability, which experiences a daily average of three tremors lesser in intensity than degree III. of the Modified Mercalli Intensity scale. Figure 1 shows the Seismotectonic map of the territory of Bosnia and Herzegovina.



Figure 1. *Seismotectonic map of the territory of Bosnia and Herzegovina*

Observed in the long run, the territory of Bosnia and Herzegovina is tectonically bound to the large fault zone or line in the Earth's crust starting in the north of India (Himalayan range),

which runs through Iran, Turkey and Greece (eastern Mediterranean) and the south part of our country, eventually turning southwest. Along with this major fault, there are several regionally important smaller fault lines (Bugojno, Višegrad, Neretva and Banja Luka fault lines). High-intensity earthquakes are possible to occur along any of these fault lines, and quite often minor tremors happen along them. The area of the City of Banja Luka incorporates the Banja Luka basin and its perimeter, which was created by the central part of the area sinking and the rim rising to an irregular shape. The seismogenic part of the Banja Luka Region covers an area of approximately 10,000 sq. km, with a diameter running 50 km far from Banja Luka, and is of great interest for the study of plate tectonics because it is one of the most seismically active epicentre zones of Bosnia and Herzegovina and the wider region. It is characterised by deep faults, which are the source of constant seismic activity. It lies between 16°30'E and 18°00'E, and between 44°20'N and 45°10'N.

In terms of tectonics, the wider area of Banja Luka extends to incorporate the central part of the Inner Dinaric Alps, which is a zone of Paleozoic shales of Mesozoic karst. In 1969, Banja Luka was struck by three high-intensity earthquakes. Table 1 presents their hypocentral depths and magnitudes. The findings of the seismological instrumental measurements conducted in the aftermath of the events indicated the presense of a large complex local earthquake hypocentre area covering approx. 1,000 sq. km at a depth of 25 km. The epicentres of the 1969 earthquakes were approx. 14 km north of the City of Banja Luka.

Table 1. *Depth of hypocenter and magnitude earthquake*

Date	Depth of hypocenter (km)	Magnitude
26. 10. 1969	15	5.6
27. 10. 1969	25	6.6
31. 12. 1969	13	5.4

The highest-intensity naturally occurring earthquake that struck the Banja Luka area occurred on 20 May 1888. The earthquake intensity at the epicentre was degree VII. of the Modified Mercalli Intensity scale, magnitude $M=5.2$, and according to historical data, it was the most devastating earthquake that has ever hit the wider region. Along with naturally occurring tectonic earthquakes, the Banja Luka region has experienced tremors resulting from the construction of the dam and reservoir on the River Vrbas for the needs of the Bočac power plant. There were plans to develop a mathematical model to calculate the seismic risk for the Bočac dam and verify it based on experimentally obtained dynamic properties. However, the model was never verified, with the country getting into a dire economic situation in the meantime. The superiority of the currently used geodetic tools and techniques allows the implementation of the plans devised in the past.

UP-TO-DATE GEODETIC TECHNIQUES

Until recently, the science of seismology was the main discipline used to study large earthquakes. However, constant improvements in the field of measurement technology used in geodetic sciences have opened up possibilities to introduce and apply new techniques to collect and process data with the aim of detecting wider zones of seismic activity and of quantifying motion in the Earth's crust to centimetre accuracy, and to present the findings using highly precise graphics. This is an area in which geodesists can assist seismologists and geophysicists with the study of geodynamics and earthquake prediction.

Tectonic forces may be very strong and cause large-scale deformations in the Earth's surface, but they may also be minute, in which case highly accurate measurements are required, which is essentially the main task of geodesy as a science. Triangulation was the first ever method used to determine the position of points on the Earth's surface. Satellite Laser Ranging (SLR) was the next innovation, followed by Very Long Baseline Interferometry (VLBI). The greatest advancement came with the development of the Global Positioning System (GPS) and Satellite Radar Interferometry (InSAR). The final two listed techniques are currently used most frequently, whether separately or combined, to measure geodynamic displacements.

GPS/GNSS

The rapid development of GPS/GNSS (high-frequency resolution of up to 20Hz) has meant the possibility to continuously monitor events in seismically active zones and to simultaneously measure both horizontal and vertical displacements.

The use of satellite GPS/GNSS positioning has significantly upgraded the role of geodesy and geodetic deformation analysis when it comes to multidisciplinary approaches to the study of neotectonic movements in the Earth's crust. GPS seismic networks used to monitor geodynamic displacements in the Earth's crust are extremely precise, small in size, very efficient, easy to operate and suitable for work in all weather conditions. Figure 2 shows the common stabilisation procedure for GPS stations that are part of seismic networks.



Figure 2. *Stabilisation procedure for GPS stations that are part of seismic networks.*

The method most frequently used to monitor geodynamic events is repeated GPS measurements. Obtaining statistically significant data on a tectonically active area requires that GPS measurements be conducted at least once per year. The point coordinates measured at different epochs are used to interpolate point velocities for the purpose of obtaining velocity fields. This procedure allows the determination of displacement values between any two measurement epochs.

The continuous monitoring of geodynamic events has proven the most efficient method because GPS stations, or antennas, are permanently fixed to the bedrock. The antennas are connected to GPS receivers, which record code and phase data around the clock, 365 days a year.

SATELLITE RADAR INTERFEROMETRY

Satellite radar interferometry is a technique that uses pairs of high-resolution stereo satellite images of the Earth's surface. It is one of the most advanced techniques used to collect spatial data needed for geodynamic analysis. There are several imaging techniques belonging to satellite radar interferometry that ought to be listed here, namely, the use of synthetic aperture radars (SAR), of interferometric synthetic aperture radars (InSAR), and PS-InSAR, or permanent scatterers – interferometric synthetic aperture radars, an advanced InSAR technique, with which issues of temporal and geometric decorrelation have been resolved.

Some important characteristics of SAR imagery are that image resolution is independent of the sensor-to-target distance, the accuracy of the coordinates of SAR pixels is independent of the position of the platform hosting the sensor, and data may be collected at any time of day (the presence of clouds does not interfere with SAR data collection).

Synthetic aperture radars (SAR) are radar sensors with laterally positioned antennas used to produce synthetic apertures. With the SAR technique, microwave pulses are emitted from the sensor to an area of land, which then bounce back and return to the sensor. The sensor holds a receiver with an antenna, which captures the signals reflected off the ground. The sensor-to-target distance is calculated based on the elapsed time, and takes into account a myriad of signals reflected, i.e., their amplitude and phase information. Figure 3 illustrates a SAR imaging system. A digital SAR image is a high-resolution mosaic (consisting of two-dimensional series of columns and rows) showing an area of land. The main unit of a SAR image is the pixel; each pixel corresponds to a tiny area on the Earth's surface and carries the amplitude and phase information of a microwave signal bouncing back off the Earth's surface (return signal). The amplitude, whose quality depends more on the ground roughness or configuration than its chemical composition, is used to identify the surface structure (rocks, vegetation, buildings). Mostly rocky and urban terrain reflects high-amplitude waves, while flat surfaces, such as water bodies, reflect low-amplitude waves.

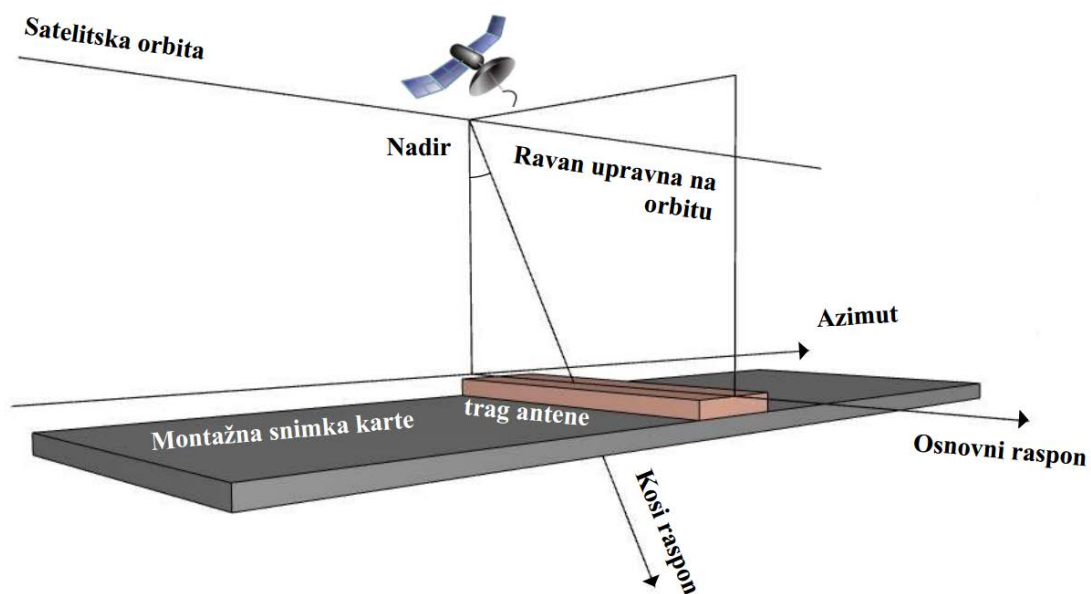


Figure 3. *Illustrates a SAR imaging system*

InSAR (SAR interferometry) is a high spatial resolution imaging technique, which allows the collection of large amounts of information used to study and monitor a range of phenomena related to the Earth's surface (deformation of the Earth's surface due to earthquakes, floods, landslides, volcanism and subsidence). It represents a ground imaging technique in which two SAR sensors are operated from two closely spaced orbits at different times, producing images whose pixels have the same amplitude values but different phase values. DInSAR (differential interferometry) operates similarly, but is mainly used to detect relatively small displacements or deformations, based on sets of three images of an area of land, with similar geometry and phase values (sufficiently little time must elapse between the taking of the images to ensure minimal image distortion). Figure 4 illustrates The geometry of the satellite SAR interferometry.

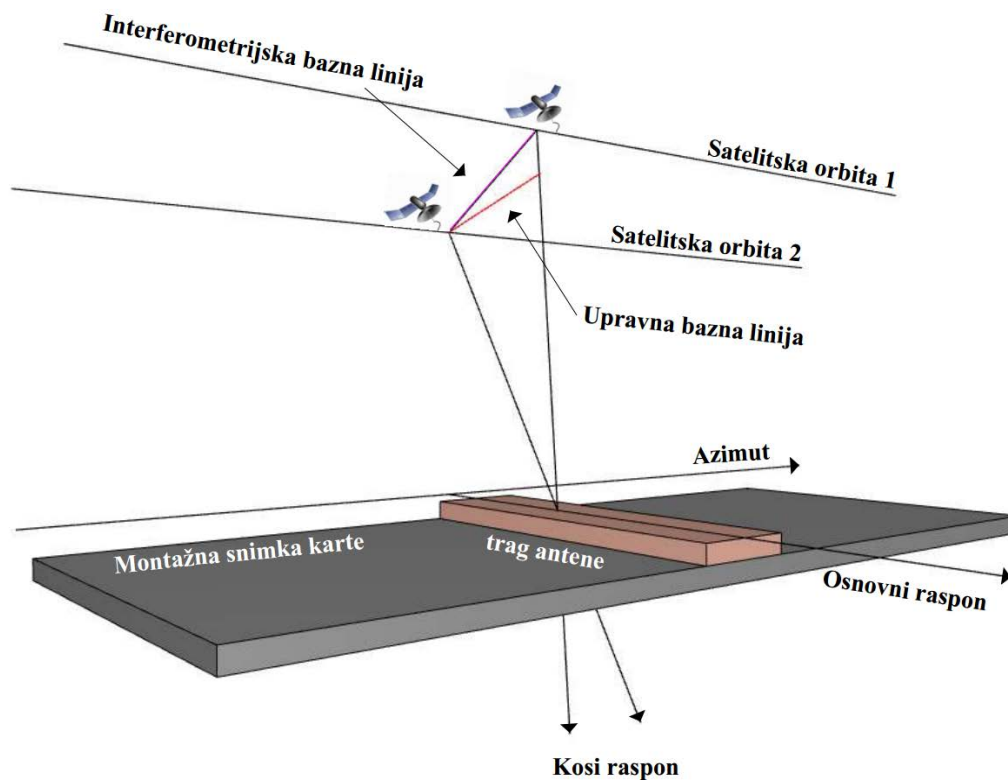


Figure 4. *The geometry of the satellite SAR interferometry*

As previously stated, PS-InSAR is an advanced InSAR technique, with which issues of temporal and geometric decorrelation have been resolved, and which allows the removal of bad weather effects. Permanent scatterers or PS radar targets are distributed across the Earth's surface. They permit the systematic monitoring of the movement of objects and determining the speeds at which they move with several millimetre accuracy. As the Earth revolves around its axis and the satellite moves along its orbit, it is possible to image a target area using two geometries, namely, while the satellite is in the ascending mode and moves from the south to the north along its orbit, illuminating the target area in the west-east direction, and while it is in the descending mode and moves from the north to the south, illuminating the target area in the east-west direction. Like any other technique, PS-InSAR has its advantages and drawbacks. PS-InSAR is used to obtain especially accurate measurements of vertical displacements, and it is of great help when used alongside such traditional techniques as GPS/GNSS, which are used to measure horizontal positions with great accuracy. Ideally, these techniques ought to be combined as often as possible. InSAR is one of the fastest developing techniques; its global coverage and operability in all weather conditions is increasingly making it the technique of choice for studying the Earth and distance detection. It has considerably contributed to the development of models used to predict a number of natural hazards, such as volcanic eruptions, earthquakes, landslides, etc. Besides, InSAR provides tools for exploring and studying groundwater, surface water, soil moisture, etc.

CLOSING CONSIDERATIONS

The fact that the Banja Luka region has relatively frequently been struck by severe earthquakes and that they pose a constant hazard means that preventive measures should be taken in the early stages of spatial and urban planning and design, in order to minimise the possibly devastating effects of earthquakes.

With the process of globalisation taking place at ever growing speeds, greater attention should be paid to monitoring the motions of the Earth and to predicting earthquakes, which asks for the establishment of regional and global seismic monitoring networks. The development of advanced technologies and the establishment of the SRPOS network of permanent GPS stations in the territory of the Republic of Srpska have made it possible to study the area of the City of Banja Luka, which has the greatest population and construction density in all of the Republic of Srpska. The accuracy of these geodetic measurements opens up possibilities for geodesists to conduct multidisciplinary research/experiments and prove that the possibility of ensuring effective protection against earthquakes and preventing their devastating effects is a highly probable one.

Most often, geodynamic network measurements are read once a year or over pre-specified intervals, depending on the seismic activity as observed in the area under consideration. Certainly, networks in areas of heightened earthquake activity will require the addition of new stations and more frequent readings, as well as improvements based on new scientific discoveries and innovations. Multiple precise geodetic measurements are used to produce authentic geodetic models of motions/displacements in the Earth's crust. This permits the calculation of kinematic displacements at different points, i.e. development of velocity models incorporating geodetic network points along both the horizontal and vertical axes, for displacement values ranging between 1 mm/year and several cm/year. The implementation of projects of this kind, leading to the establishment of such measurement systems, enables the collection of data on displacements in the Earth's crust, landslides, avalanches, as well as displacement and deformation of buildings and structures and their immediate surroundings.

All this information may assist with establishing boundaries of microseismic zones, making decisions on large building and structure reconstruction (foundation and structural rehabilitation), landslide mapping, etc. These explorations may just as well be helpful with determining the measures required to mitigate the effects of earthquakes and take when choosing to build in the seismic zones of the Banja Luka region.

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Effects of opioid addiction on male reproductive system in rats

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Abstract

Problem: Despite large number of studies addressing the impacts of opioid consumption in women on pregnancy outcomes, there are few experiments about the effect of opioids on male fertility.

Objectives: The aim of the present study was to measure the effect of opioids and its derivatives morphine on male reproductive system of male rats.

Research methods: Forty male Wistar albino rats were randomized into 5 equal groups which were exposed either with morphine, naloxone, naloxone and morphine, or Sham and one group was considered as control. Histological features and Spermatogenesis were assessed after 6 months exposure to the opioids based on measurement of spermatogonia, spermatocyte, spermatid, and sperm. Data were then analyzed to reveal the significance of the observed differences.

Results: Among 5 groups of 8 rats in this study, the cell count was different for spermatogonia, spermatocytes, spermatids, and sperms as the mean number of these cells were the least among the subjects of the morphine group followed by morphine/naloxone and naloxone group. This difference was more remarkable in Sham and control groups. In addition, the differences observed between the subjects were statistically significant ($p < 0.001$).

Conclusions: Our study showed that Morphine and other opioid derivatives could reduce all the cellular populations in the process of spermatogenesis.

Key words: Opioid, Morphine, Spermatogenesis, Sperm, Fertility, Male rats.

Introduction

Despite large number of studies addressing the impacts of opioid consumption in women on pregnancy outcomes (1-3), few have argued such an effect on male fertility along with

paternal exposure relationship in development of offspring physiological and behavioral features (4). In clinical setting, drug abuse has been correlated to the behavioral susceptibility of children (5, 6). However, due to the many involved confounding variables, the underlying explanation for this relationship has never been well elicited (4).

In contrast to the human subjects, animal models are possible to be examined in a more direct and objective manner allowing for more robust and much more biological assessment of the underlying processes (4, 7-9). With this in mind, extensive amounts of evidences have supported the relationship between chronic exposures of adult male rodents to opiates with development of the future generation (7, 10-12). Again no single study has elucidated the concise mechanism of this phenomenon yet. Even the histological changes of the reproductive system have not been investigated with an efficient amount of data. Our study hence aimed to evaluate the histological alterations and cellular generations in adult male rat testis under a chronic exposure to opioids and its derivative morphine to reveal the status of fertility on the paternity of this animal model.

Methods

Through an experimental animal study, 40 adult male Wistar albino rats were obtained from Pasteur Institute in Tehran, Iran with a mean age of 3 months and a weight range of 250 to 300 grams. The rats were housed singly in a room set at a 12 light/ dark cycle provided with proper nutrition. Temperature was set between 20 to 24 °C. The rats were randomized into 5 group as follows: morphine, naloxone, naloxone and morphine, sham, and control. All protocols provided by Institutional Committee of Animal care were exactly followed.

Morphine sulfate was administered in a dosage of 10 mg/kg subcutaneously in 12 rats for 7 days i.e. days 0, 10, 20, 30, 40, 70, 80. On the other hand, 15 rats were only administered normal saline while a third group was kept naive to enter the study. Addiction was examined by administration of 5 mg/kg intra peritoneal naloxone and the withdrawal symptoms were checked subsequently including tremor, movements of limb off the baseline floor or occurrence of diarrhea after 30 minutes of injection. To avoid stress effects, normal saline was injected for the second group.

On day 6, rats were scarified by chloroform and the testes kept at fixative solutions for 24 hours. The tissue then was washed with alcohol, embedded in paraffin, sliced in a 5 μ thickness and finally stained with hematoxylin and eosin to undergo light microscopy by objective lens with 400X magnifications. All the samples then were counted for spermatogonia, spermatocytes, spermatid, and sperms in terms of cell number and morphology by Image Tool version 2.

Data were then analyzed by Statistical Package for Social Sciences (SPSS Inc, Chicago, USA) version 14 to reveal the difference of fertility indices between groups. One-way ANOVA followed by Tukey's post-hoc test was applied for parametric variables while Kruskal-Wallis ANOVA followed by Dunn's post-hoc test used to analyze the nonparametric data and the obtained values were considered significant at $p < 0.05$.

Results

Of 40 Rats in this study, 8 were assigned to each of the 5 groups including morphine, naloxone, morphine and naloxone, sham, and control group. The characteristics and measurements of the fertility parameters are summarized in table1. Histopathological slides of different groups are shown in figure 1.

In terms of spermatogonia count, the mean \pm SD was 51 ± 3.46 in the group of Morphine, 65 ± 3.46 in the naloxone group, 66 ± 3.62 in the group of morphine and naloxone, 68 ± 2 in sham, and 69.37 ± 1.40 in the control group (table1). Also the observed difference was statistically significant ($p < 0.001$).

Counting the number of spermatocytes, a mean \pm SD of 60 ± 2.77 was obtained in morphine group, followed by 125 ± 3.16 in naloxone group, 124 ± 3.58 in morphine and naloxone group, 128 ± 2.87 in sham, and finally 135 ± 6.54 in the control group (table 1), which did reveal a statistically significant difference ($p < 0.001$).

Regarding the measurement of spermatid counts, the values of mean \pm SD were as follows: 0 ± 0 in morphine group, 51.62 ± 21.59 in naloxone group, 57 ± 4.59 in morphine and naloxone group, 64 ± 3.46 in sham and 64.62 ± 4.06 in control group (table 1). Also these differences were of statistically significance between groups ($p < 0.001$).

Finally, sperm counts were as 0 ± 0 in morphine group, 235 ± 3.77 in naloxone group, 220 ± 3.81 in morphine and naloxone group, 247.12 ± 6.10 in sham, and 250 ± 6.54 in control group with a statistically significant difference ($p < 0.001$).

Table 1. Comparison of fertility parameters between study groups.

Group	Number (n)	Percentage (%)	Spermatogonia	Spermatocyte	Spermatid	Sperm
Morphine	8	20	51 ± 3.46	60 ± 2.77	0 ± 0	0 ± 0
Naloxone	8	20	65 ± 3.46	125 ± 3.16	51.62 ± 21.59	235 ± 3.77
Morphine + Naloxone	8	20	66 ± 3.62	124 ± 3.58	57 ± 4.59	220 ± 3.81
Sham	8	20	68 ± 2	128 ± 2.87	64 ± 3.46	247.12 ± 6.10
Control	8	20	69.37 ± 1.40	135 ± 6.54	64.62 ± 4.06	250 ± 6.54
P-value	-----	-----	<0.001	<0.001	<0.001	<0.001

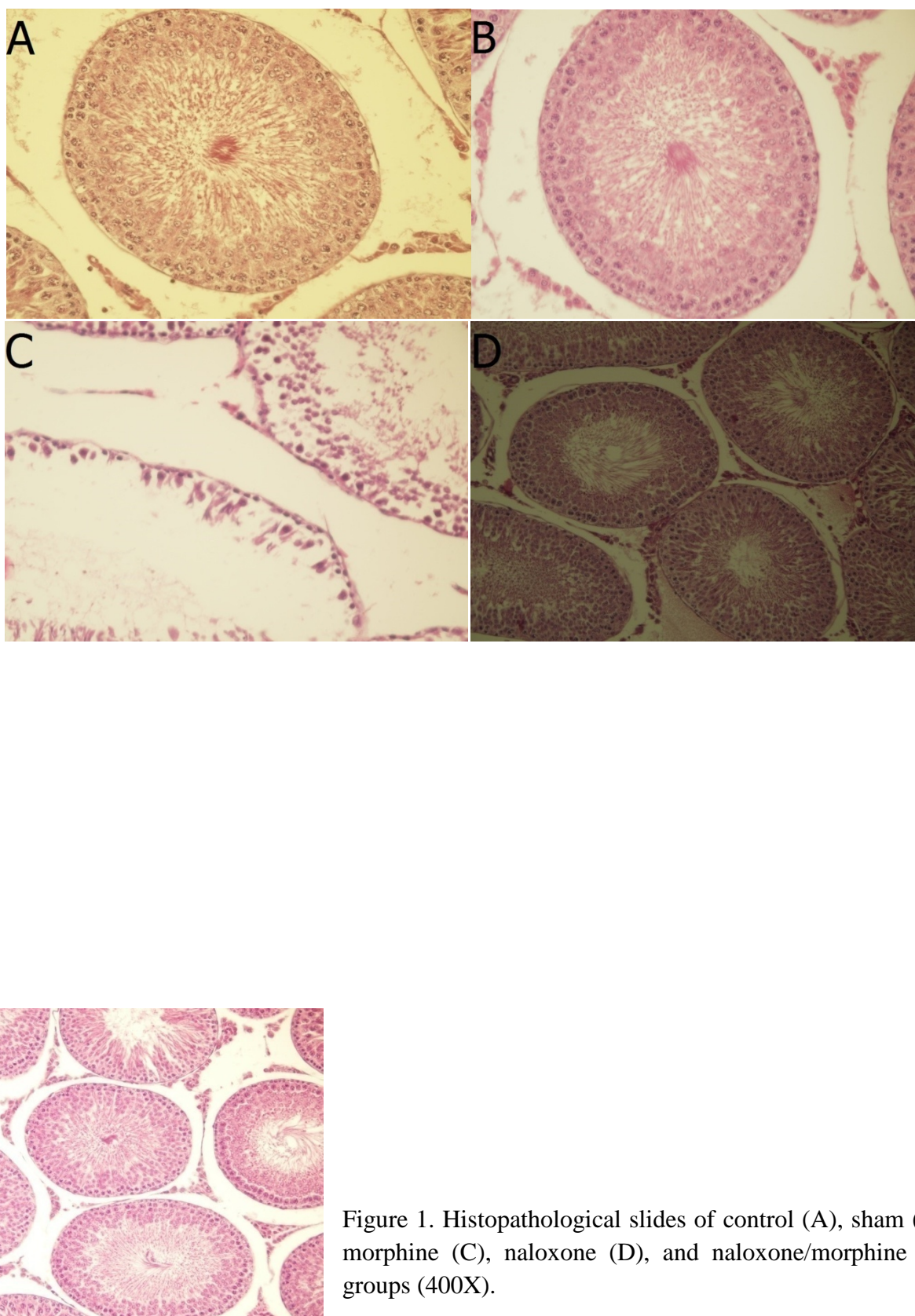


Figure 1. Histopathological slides of control (A), sham (B), morphine (C), naloxone (D), and naloxone/morphine (E) groups (400X).

Discussion

Opioid system as a biological communicating apparatus is modulated by opioid peptides. Besides, these endogenous peptides play an important role in the control of pituitary luteinizing hormone (LH) secretion, acting on releasing of gonadotrophin hormone (GnRH)

release from the hypothalamus (13, 14). Administration of exogenous opiates such as morphine has been shown to lower the levels of LH (15) in contrast to the blockade of endogenous opioid peptide receptor (16, 17).

Our study indicated that all spermatogenic cell populations had decreased under the effect of chronic exposure to morphine sulphate. The same results have been already reported by James and colleagues as they have noted reversion of the observed phenomenon and improvement of the pituitary hormonal levels after 13 weeks withdrawing of the drugs (18). In addition, in the current study, administration of naloxone was associated with modification of spermatogenic cells counts compared with previously exposure to Morphine sulphate. Nevertheless, the cell counts did not reach to the physiologic level in either group. This could be explained by the results of Bablok *et al.* in which elevation of serum levels of LH, FSH, prolactin, and estradiol was observed while the amount of free testosterone was significantly diminished after performing of naloxone test administering 0.4 mg naloxone intravenously (19). However, in contrast to the present study, Cicero *et al.* have concluded that sperm counts and motility are not affected by administration of morphine sulphate (4). In addition, the response of LH to naloxone seems to be related to the concentrations of circulating gonadal steroids in healthy men (17) and women (16).

The effects of morphine and other opiates on reproductive system as well as germ cells and gonadal cell population have been thoroughly studied. Many alterations in reproductive systems of rats have been contributed to these opioid derivatives. The lower pregnancy rate in female rats mated with opiate exposed male has been suggested to be influenced by the decreasing effects of morphine on sex organ secretions including seminal vesicles and prostate which together provide a transporting pathway for sperms (20-22).

It seems that morphine and its families could act directly on the opioid receptors and at the same time have a negative regulatory impact on serum levels of sex and other gonadal hormones. In addition, direct effect of opiates on morphology and function of sperm and its progenitors should never be neglected.

Our study had some limitations which should be taken into account before interpretation of its results. It is of interest if further studies evaluate morphology and motility of sperms under the same circumstances as our rats had in this study. In addition, evaluating the effects of other opioid derivatives could be beneficial to make difference between similar but functionally different substances.

Conclusions

We showed that exposure to morphine could reduce the number of all spermatogenesis cell population in male rats. In addition, administration of naloxone would be of modulatory effect on cell count of this population.

Conflict of interests

The authors declare that they have no conflict of interests.

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Anti-inflammatory effects of *Salvia multicaulis* root extract against carrageenan-induced hind paw edema in mice

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Abstract:

Problem: Nowadays, inflammation is known as the basis of many diseases. *Salvia multicaulis* is a member of the *Lamiaceae* family with more than 900 species all over the world, while 58 species are found in Iran. *S. multicaulis* was used in traditional medicine because of its widespread effects such as anti-inflammatory, antioxidant-, antispasmodic, antimicrobial, etc.

Objectives: The aim of this study is to investigate anti-inflammatory effects of *S. multicaulis*.

Research methods: Thirty male adult mice were divided into five groups randomly. The first group received normal saline. The second, third and fourth groups received methanolic extract of *S. multicaulis* in doses of 50, 100 and 200 mg/kg, respectively. The fifth group received indomethacin (5 mg/kg). All injections consisted of 0.5 ml intraperitoneally. Thirty minutes after injection, 0.2 ml of 1% solution of carrageenan in normal saline was injected in right hind paw subcutaneously, and mice's hind paw diameter were measured up to five hours after carrageenan injection using a digital micrometer.

Results: *S. multicaulis* extract (50, 100, 200 mg/kg) significantly reduced edema in a dose-dependent manner in every five hours of measurement, $p < 0.01$, $p < 0.002$, $p < 0.04$, $p < 0.007$, respectively. The higher dose (200 mg/kg) had the most powerful anti-inflammatory effect. In fact, the anti-inflammatory effect and inhibition percentage of edema in doses of 100 and 200 mg/kg in times of two to five hours was even higher than indomethacin (5 mg/kg).

Conclusions:The methanolic extract of *S.multicualis*reduced inflammation and local edema.As a result, it maybe administered as an adjuvant anti-inflammatory drug to reduce complications of non-steroidal anti-inflammatory drugs (NSAIDs).

Key words: *Salvia multicualis*, Anti-inflammatory, Hind paw edema, carrageenan test, Mice

Introduction

The inflammatory reaction can be prompted by a variety of mediators including eicosanoids derived from the cyclooxygenase (COX) and 5-lipoxygenase (5-LOX) pathways[13]. Arachidonic acid (AA) mainly released from the cell membrane by phospholipase A₂ (PLA₂) is converted to eicosanoids by the action of cyclooxygenase (COX) and lipoxygenase (LO).Kinin system is one of the plasma protein systems which has an important role in inflammatory reaction. Bradykinin as the most important product of this system starts the inflammatory reactions and causes the pain and edema [1, 27]. The inflammatory response induced by carrageenan isresulted of prostaglandin release through AA metabolism via the COX pathway. It is showed thatnitric oxide (NO) activatesthe COX followingoverexpression of inducible nitric oxide synthase (iNOS) in carrageenan-induced paw edema, which has a stimulatory effect on hind paw inflammation process by increasing prostaglandin biosynthesis at the inflammatory site[12]. Non-steroidal anti-inflammatory drugs (NSAIDs) such as indomethacin inhibit COX and reduce prostaglandins formation at the inflammation site (Dhara et al, 2000).

The genus *Salvia*is one of the most important genuses of *Lamiaceae* family and consists of more than 900 species all over the world which 58 species of this genus are found in Iran and 17 species of them are endemic that one of them is *Salvia multicaulis*[15, 16, 17].*Salvia* species have been used for the treatment of various inflammatory conditions intraditional medicine (Baytop, 1984). The all genus of *Salvia*are popular for their multiple pharmacological effects includinganalgesic, anti-inflammatory,antispasmoic,antibacterial,antiseptic,diuretic,hypoglycemic activities, anti-ischemia,antioxidant, hepatoprotectiveproperties, andseveral studies have showed the beneficial efficacy of themagainstAlzheimer`s disease,dementia,pharyngitis and adult cold [4,5,11]. Four main category of Chemical compound are found in salvia genus including; monoterpenes, diterpenes (tanshionoes), phenolic acid and flavonoids(Imanshahidi and Hosseinzadeh 2006).Phenolic materials existing in *Salvia*have anti-inflammatory effects and its flavonoids possess anti-oxidant properties. Different species of *Salvia* have showed antioxidant effects. It is established thatkarnozeic acid, rosmaric acid, rosemanol, karnosol, salvanic acid A and B are free radicals scavengers (Mosaddik, 2003;Koo et al, 2004).

The essential oils and extracts of *S. multicaulis* collected in Turkey showed anti-microbial and anti-oxidative activities and most of the components isolated from the extracts of *S. multicaulis* were terpenoids. Monoterpenoid hydrocarbons, in *S. multicaulis* oil accounted for the 10.6% and were particularly represented by α -pinene (5.5%). Also, oxygenated monoterpenoids were abundant (23.9%) and in this fraction the main compounds were myrtenol(4.6%), sabinyl acetate (4.6%) and 1,8-cineole (3.1%). In addition, the oil from Iran

are different from the high content of camphor, 1,8-cineole and α -pinene that characterize them. [2, 5, 24].

The antioxidant activities of four Lamiaceae plants, *Salvia viridis* L., *Salvia multicaulis* Vahl, *Stachys byzantine* C. Koch and *Eremostachys laciniata* (L.) Bunge have been determined. All extracts were shown to possess a significant scavenger activity against 1,1-diphenyl-2-picrylhydrazyl (DPPH) free radical and an inhibitory effect on H₂O₂- or HOCl-luminolchemiluminescence (Erdemoglu et al, 2006). Similarly, the antioxidant activities of the methanolic extracts of 9 *Salvia* species and 15 other Lamiaceae plants growing in Iran were evaluated using ferric reducing antioxidant power (FRAP) and DPPH free radical scavenging assays. The study shows that some Lamiaceae plants growing in Iran represent good potential sources of natural antioxidants useful for either prevention or treatment of oxidative stress-related diseases (Firuzi et al, 2010).

Phytochemical investigation on *S. officinalis* L. revealed that triterpenoid, ursolic acid and its isomer oleanolic acid (up to 4% in leaves, dry weight basis), act anti-inflammatory effect and inhibit tumorigenesis in mouse skin. Recent data on the anti-inflammatory activity of sage extracts when applied topically (ID₅₀= 2040 μ g/cm²) and evaluated as edema inhibition after Croton oil-induced dermatitis in mouse ear, confirm ursolic acid to be the main active ingredient, responsible for sage anti-inflammatory effect [10,15].

Effect of *Salvia* on AA, PLA₂ and COX can inhibit production of PG₂, PLA₂ and AA, that conclude reduce of hind paw edema and show its anti-inflammatory effect [8]. Inflammation as a major cause of many diseases has four main clinical sign: redness, hyperthermia, tenderness and edema. So edema can be good marker to evaluate the inflammation. According to known of chemical components of *S. multicaulis* and other studies, there are limited studies about anti-inflammatory effects of this species, it seems that analyze of anti-inflammatory effects of *S. multicaulis* is worthwhile.

Accordingly, the goal of this study is to evaluate efficacy and maximum anti-inflammatory dosage of *S. multicaulis* on hind paw edema in mice and compare it with indomethacin as a reference drug from NSAIDs.

Methods

Plant material

S. multicaulis was collected from Kermanshah province (west of Iran) in spring 2012. Its roots were dried at shadow and powdered. The powder (100g) was extracted with methanol (1000 mL) overnight, at room temperature with constant stirring. The extract was filtered and the filtrate was concentrated at 30°C under reduced pressure in a rotary evaporator. The yield (w/w) of the crude extract was found to be 12.08%. The crude extract was dissolved in Tween 80 (0.5%) to required concentrations.

Animals

Male adult NMRI mice, weighting between 25-35 g were used for this study which were gather from the Faculty of Pharmacy, Tehran University of Medical Sciences, Tehran, Iran. They were housed in standard condition with temperature of 21 ± 2 and 12/12 hours light/ dark cycle.

Carrageenan-induced hind-paw edema

This test assesses edema induced by carrageenan in animal's paw that has maximum edema by 3 to 6 hours after injection. It is a multi-mediated phenomenon; include the releasing of a various mediators. it is believed to be biphasic, the early phase (1–2 h) of the carrageenan model that is the main result of edema induced by carrageenan is associated with the exudative stage of inflammation that mediated by histamine, serotonin and increased synthesis of prostaglandins in the damaged tissue surroundings by local cells. That is mention one of the important processes of inflammatory disorders. The late phase is promoted by prostaglandin release and mediated by bradykinin, leukotrienes, polymorphonuclear cells and prostaglandins produced by tissue macrophages[3, 12, 28].

In this study, the mice were divided into five groups of six. Group-I received only 0.1ml of carrageenan solution 1% sub cutaneously(s.c.) in right hind paw to create edema(control), Group-II, III and IV received methanolic extract of *S.multicaulis* in 3 doses 50, 100, 200 mg/kg, respectively that was injected intraperitoneal initially (i.p.) and after one hour the hind paw was measured and the procedure was continued by injection of 0.1 ml of carrageenan 1%. Group-V received 5 mg/kg indomethacin(i.p.) which was injected one hour before carrageenan exactly like Group-II, III and IV.

In all groups anti-inflammatory effect was investigated by measuring the right hind paw volume at 0, 1, 2, 3, 4, 5 hour following carrageenan injection using quills (digital caliper 0-150mm). Finally we compared the difference between the initial, through 5 hours and the last edema volume in groups which gave *Salvia multicaulis* as experimental drug and indomethacin with control group.

Statistical analysis

The data were analyzed by ANOVA test and multiple comparison tests with Tukey test, and T-test was done which $P < 0.05$ was valuable and significant statistically.

Results

In this study the data were analyzed in the first to five hours in groups which *S.multicaulis* was given in 3 doses and indomethacin after carrageenan injection, the results showed anti-inflammatory effect of $p < 0.002$, $p < 0.04$, $p < 0.007$, $p < 0.01$, respectively (Figures 1 to 5). In the first hour after injection of *S.multicaulis* (50 mg/kg) in comparison of control group that drug did not use, it shown significant anti-

inflammatory effect ($p=0.002$). It means that the low dose of *Salvia multicaulis* that we need to have anti-inflammatory effect is 50 mg/kg dosage.

In dose of 100 mg/kg there is significant anti-inflammatory effect by $p=0.04$ and also in 200 mg/kg it had anti-inflammatory effect with $p=0.007$. To compare the efficacy of 3 doses of drug, we had to do multiple comparisons with Tukey test, the result showed significant anti-inflammatory effect in 200 mg/kg dose versus 50 mg/kg, particularly in 3 hour with $p=0.03$ (Fig. 1). In addition, it showed the maximum effective dose is 200 mg/kg and then by increasing the salvia dose we could have more anti-inflammatory effect. With comparison of 3 doses of salvia with indometacin, there was not significant different anti-inflammatory effect in 50mg/kg and 100mg/kg in dose with indometacin ($p>0.06$). Nevertheless, increase hind paw edema diameter (mm) at various times intervals with Indomethacin was significant different from salvia in 100 and 200 mg/kg doses, also percentage inhibition (%) of edema with herbal drug in 100 and 200 mg/kg doses in the 2,3,4,5 hours of experiment was more than indomethacin (Fig. 2, 3, 4).

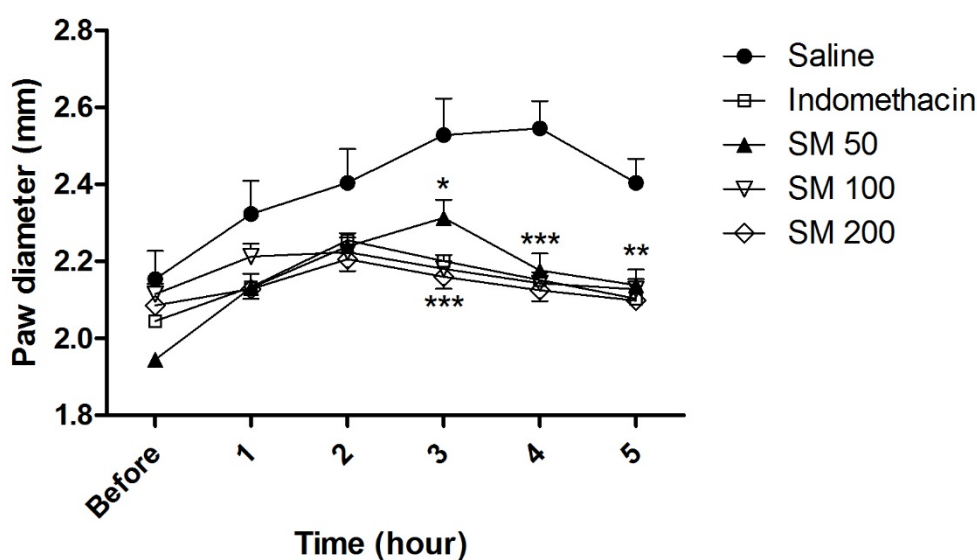


Figure 1. Effects of normal saline, indomethacin (5 mg/kg) and extract of *Salvia multicaulis* (50, 100, and 200 mg/kg) on the paw diameter in carrageenan test.

*: Significant difference with the corresponding time of normal saline group ($P\leq 0.05$)

**: Significant difference with the corresponding time of normal saline group ($P\leq 0.01$)

***: Significant difference with the corresponding time of normal saline group ($P\leq 0.0001$)

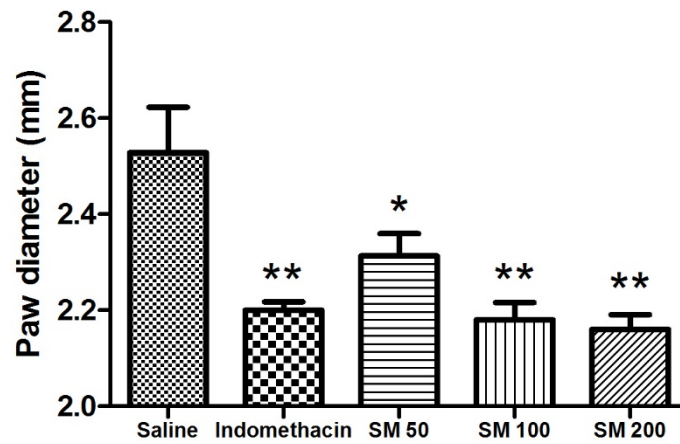


Figure 2. Effects of normal saline, indomethacin (5 mg/kg) and extract of *Salvia multicaulis* (50, 100, and 200 mg/kg) on the paw diameter in three hours after carrageenan injection.

*: Significant difference with normal saline group ($P \leq 0.05$)

**: Significant difference with normal saline group ($P \leq 0.0001$)

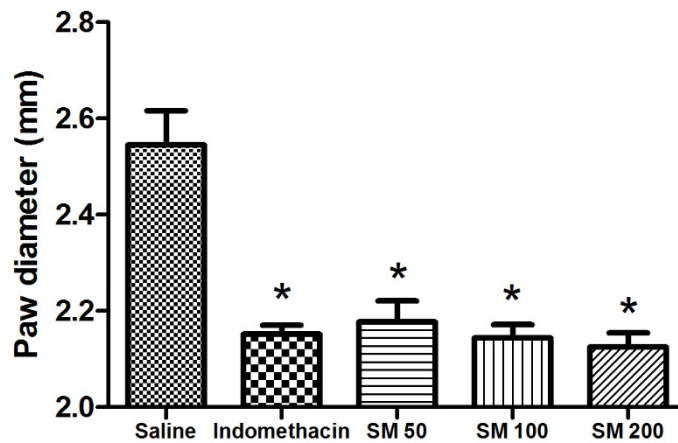


Figure 3. Effects of normal saline, indomethacin (5 mg/kg) and extract of *Salvia multicaulis* (50, 100, and 200 mg/kg) on the paw diameter in four hours after carrageenan injection.

*: Significant difference with normal saline group ($P \leq 0.0001$)

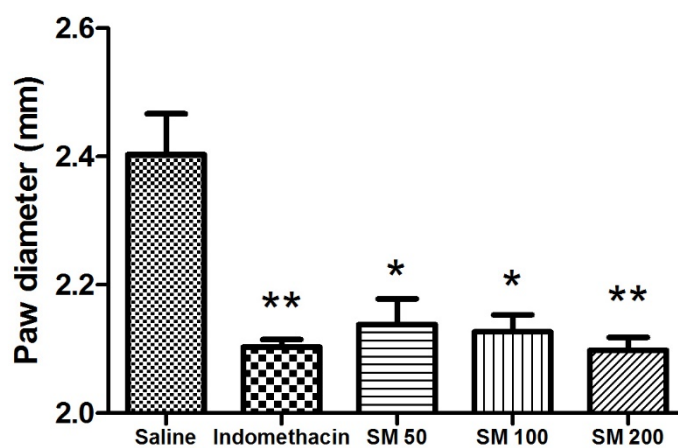


Figure 4. Effects of normal saline, indomethacin (5 mg/kg) and extract of *Salvia multicaulis* (50, 100, and 200 mg/kg) on the paw diameter in five hours after carrageenan injection

*: Significant difference with normal saline group ($P \leq 0.01$)

** : Significant difference with normal saline group ($P \leq 0.001$)

Discussion

The present study demonstrated anti-inflammatory effect of *S. multicaulis* methanolic extract in mice's paw edema test induced by carrageenan. In our findings, *S. multicaulis* extract (50, 100, 200) had significantly reduced edema in every 5 hours of measurement dose dependently. The extract in higher dose (200 mg/kg), reduced inflammation more strongly and demonstrated more anti-inflammatory effect. Interestingly, the anti-inflammatory effect and the percentage of edema inhibition (%) in doses 100 and 200 mg/kg in the 2,3,4,5 hour of experiment was more than Indomethacin.

Diterpenes (tanshinones) are the major component responsible for the diverse pharmacological effect of root of salvia genus (Ryu, Lee et al. 1997). For example more than 30 different diterpenes have been isolated from the root of *S. miltiorrhiza* (DU and ZHANG 2004). Moreover a study demonstrated that all kind of tanshinone with different chemical structures have anti-inflammatory activity (Jeon, Son et al. 2008). The mechanism responsible for anti-inflammatory effect of tanshinones depends on their structure for example cryptotanshinone can reduce expression of COX -2 and iNOS, this tanshinones can also blocked the activation of the transcription factors, such as NF- κ B and AP-1 (Chen, Hsu et al. 2007; Jeon, Son et al. 2008). So it can be concluded that tanshinones are the active ingredient responsible for anti-inflammatory effect of *S. multicaulis*.

In basis of evidence on chemical composition of *S. multicaulis*, triterpenoid ursolic acid and monoterpenoids are major components, so the anti-inflammatory effect of this plant may be from this component. Anti-nociceptive and/or anti-inflammatory activities have been reported for some *Salvia* genera such as *S. hemaematodes* (Akbar et al., 1984), *S. aethiopsis* (Hernandez-Perez et al., 1995) and other genera (Zargari, 1990).

In agreement with our study, anti-inflammatory effects of *Salvia Leriifolia* benth. Aqueous seed extract was investigated (Xylene-induced ear edema and Vascular permeability increased by acetic acid in mice). The aqueous seed extract showed also considerable activity against acute and chronic inflammation (Hosseinzadeh et al, 2003). Further, painkilling and anti-inflammatory effect of acetonic and metanolic extract of *Salvia aegyptica* has shown in vivo (Imanshahidi and Hosseinzadeh, 2006). Also, consistent with our experiment, *Salvia* species (*S. fruticosa*, *S. verticillata*, and *S. trichoclada*) were screened for their anti-inflammatory activity in rats (carrageenan-induced inflammatory paw edema). All extracts demonstrated anti-inflammatory activities; it can be expected that the active flavonoids, phenolic acids, and terpenoids may be responsible for the anti-inflammatory activity of these plants (Adirci et al, 2010).

These findings suggest that the extract of *S. multicaulis* has persuaded into reduce inflammation and local edema, so it maybe as an effectual drug comparable to indomethacin. The observed anti-inflammatory activities of our extract may be described to the overall effects of the plant constituents or the compounds having actions similar to NSAID and anti-oxidant activity. It may be promising as a synergist for indomethacin. This study also confirms that *Salvia* genera are good candidates for anti-inflammatory and analgesic uses.

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Conflict of interests

The authors declare that they have no conflict of interests.

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Part VII

Architecture

CONCLUSIONS AFTER EXECUTED ENERGY AUDIT OF KINDERGARTEN „JEŽEVA KUĆICA“ IN BANJA LUKA WITH RECOMMENDATIONS FOR PLANNERS AND LOCAL GOVERNMENT IN BIH

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Abstract

Energy efficiency (non efficiency) of buildings is long time problem in the world and in our region energy efficiency is a topic of interest last few years. In Bosnia and Herzegovina laws have only recently adopted. Laws are still not applied, and waiting for the law enforcement, investors build new buildings, which do not meet the energy performance. More and more energy sources are exhausted, the environment is endangered and the buildings are unconditional. In order to determine the state energy performance one of a building, it was made a research-project that is based on observing and recording current state of energy performance of kindergarten "Ježeva kućica" in the urban zone of Banja Luka. After analyzing the current situation and collecting data on power, water and heating consumption, it is made energy audit of the building and calculating of the thermal losses. It is proposed measures to improve the energy performance of buildings. Also, it is proposed preliminary design in order to increase comfort for playing and staying children. Addition, the project is important from an economic aspect because it shows a payback period and whether the project is economically justified. Through the analysis and the proposed measures it is showed that the kindergarten is in very poor conditions and in spite of large thermal losses, the problem is inadequate space. In Banja Luka, there are many of such buildings, which are in poor conditions and they are inadequate for work and residence. This shows that it is the necessary emergency interventions in terms of identification, classification and testing of energy efficiency, in order to classify buildings according to their priority interventions. It requires therefore to react in order to first rehabilitate existing buildings, and then built new buildings.

Key words: energy efficiency, energy audit, thermal losses, kindergarten „Ježeva kućica“.

Introduction

Building energy use in the future will be driven by technological change but will be influenced by other factors as well, including population and economic growth, changes in household size, changes in lifestyle, and migration patterns [1].

Energy efficiency means planned and implemented measures in order to use the minimum possible amount of energy. In that comfort should not be distorted. The term energy efficiency is related to devices, construction measures, technical and organization systems, the adoption of legal and administrative regulations for the implementation of energy measures etc.

The subject of this paper is research project, which was based on the energy audit (estimation) and characteristics of the built kindergarten "Ježeva kućica".

After recording the existing situation and collect data of consumption (electricity, water, heating) was made an energy audit of the building, then calculated average coefficients of thermal transmittance (U - value) for walls, roofs, floors, windows to propose the necessary measures to reduce energy consumption and to prevent heat losses in the building envelope.

Through the project are proposed measures to increase energy efficiency of the building, also is done a conceptual design in order to increase the comfort for the game and stay children in kindergarten.

Addition, the project is also important from an economic aspect because it shows payback period and whether the project is economically justified. This paper provides an overview of energy audit with the current regulations, and an overview of research with conclusions.

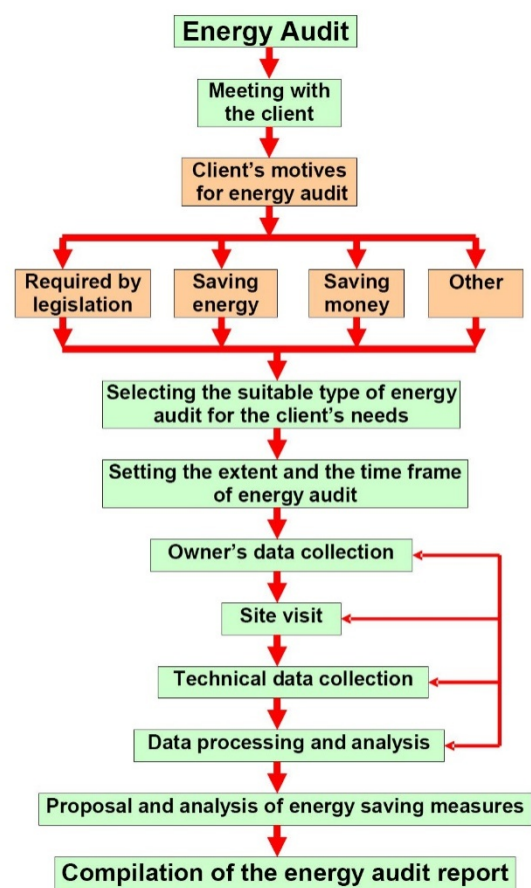
Energy audit with an overview of regulation in the field of energy efficiency

Energy audit is a term used worldwide. As with all terms, the definition and the content of an energy audit differs from person to person and from society to society. In many countries like in Finland, governments subsidise energy audits. In some countries, the law may require that energy audits are carried out at regular intervals. In both cases, governments may require that energy audits are carried out in accordance with some form or regulation for obvious reasons. These regulations tend to differ from country to country.

An energy audit is a documented process which implies the analysis of the technical and energy performance of buildings and analysis of all technical systems in buildings that use energy and water in order to determine the efficiency of energy and water consumption as well as the adoption of conclusions and recommendations to improve energy efficiency. Energy audit includes examination [2]:

- construction characteristics (thermal insulation and energy consumption)
- energy characteristics of the system for heating, cooling, ventilation and air conditioning,
- energy characteristics of the system power consumption,
- energy characteristics of the system consumption water,
- energy properties of consumer groups and other technical systems in the building.

The result of the energy audit is a written study with the current situation, suggestions for



improvement and evaluation of required investments with a payback period.

Steps to conducting an energy audit are[2]:

1. preparing for an energy audit,
2. review the existing condition of the building,
3. the determination of the energy functional units,
4. the control measurements,
5. analysis of the technical and energy performance of buildings and analysis of technical systems in the building,
6. analysis of consumption and consumption costs,
7. analysis and proposal of measures to improve the energy efficiency of buildings,
8. energy, economic and environmental evaluation of the proposed measures,
9. preparing reports on energy audit to the level of the terms of reference for the implementation of identified measures to improve energy efficiency (figure 1).

Figure 1 – Steps to conducting an building energy audit

For the EU member states the issue of energy efficiency is regulated by of European Directives which were initially only obligatory for them, but later it became obligation that all countries in the legislative and legal framework with the European directives. The most important document of the European Union in the field of energy efficiency in buildings is Directive 2002/91 / EC Directive of energy performance of buildings - EPBD which was adopted in 2002 by the European Parliament. After this directive was adopted Directive 2010/30 / EC. With this document is established a new legal framework in the field of energy efficiency buildings, which is unique for all member states. The aim is promotion of improvement of the energy performance of buildings, through increasing potential of energy savings and reducing carbon dioxide emissions in buildings. The directive defines five essential requirements:

- establishment the general framework for a methodology of calculating the energy performance of buildings,
- implementation of the minimum requirements of energy efficiency, which are adapted to local climatic conditions for new buildings;
- implementation of minimum requirements of energy efficiency for existing buildings during reconstruction;
- energy certification of buildings (energy passport); it is only necessary for newly built, sold or rented buildings and it is valid a maximum ten years;
- regular control of medium and large heating systems and air conditioning systems so that their effects can be monitored and optimized.

In Bosnia and Herzegovina are adopted the laws and bylaws of energy efficiency but they are not yet implemented. According to the Center for Economic, Technological and Environmental Development (Sarajevo) from 2012:

- prices of energy sources are increasing, and

- the largest consumer of energy in Bosnia and Herzegovina is the building sector (the largest possible savings) (Figure 2).

Therefore, it is necessary to take the necessary measures and concrete steps to change this situation.

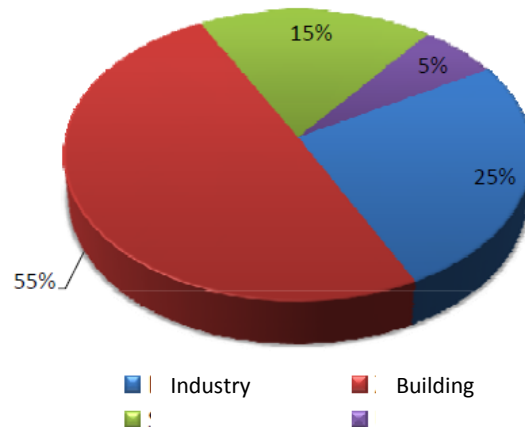


Figure2 – Energy consumption in B&H, 2009.

Energy audit of Kindergarten „Ježeva kućica“

Basic information

Kindergarten is located in the city center. It is a ground floor building which covers an area of 151.55 m² (without courts). The main access to the building is on the northwest side of the street, "Kralja Petra I Karađorđevića". This entry represents, at the same time, the entrance to the playground, which is located in the garden of the school.

Building is built in 1961. In the project of year 1961 are planned two buildings - the main and secondary building of kindergartens. The function of the main building is changed in 1995.

The building uses the humanitarian organization and functions of kindergarten is located in secondary building. To date, this situation has not changed.

The building is constructed in the classical system with massive walls of brick. Important renovation and reconstruction was not there. Interventions included plasterwork and roof repairs, due to rainwater leakage and partial repairs and maintenance. Work in terms of improving the thermal characteristics of the building envelope are not performed.

Current state of kindergarten

Research of the current state kindergarten in terms of energy efficiency is included:

- recording and analysis construction characteristics of the buildings (thermal insulation),
- recording and analysis of the energy characteristics heating system, cooling and ventilation system, electricity consumption (lighting, appliances, electrical wiring),
- recording and analysis of water consumption,
- recording and analysis of the management technical systems,
- analysis of possible changes of energy sources,

- analysis of the possibilities of using renewable energy sources.

During this study are observed large heat losses (electricity consumption per year is 34,868 kWh), damage the building envelope and installations. Also, in terms of functionality of space, it is noted some problems like lack of space, unused courtyard and inadequate access to the building.

The results of the energy audit shows:

1. exterior walls do not have thermal insulation, there is the moisture.
2. there is visible damage of windows
3. roof covering is without thermal protection layers
4. the floors of the building have not thermal protection layers,
5. the walls have not water and thermal protection,
6. there is not ventilation system.

Proposal of measures for improvement the external envelope of the building

After analysis current state of kindergarten is planned new conceptual design in terms of urban planning, function, design and other aspects, in order to creating conditions for better functioning space and reducing energy losses. Due to lack of space, the kindergarten is widened from the north-west. It is planned new entrance with a canopy and new traffic access with parking.



Figure 3 – Kindergarten „Ježeva kućica“ with playground



Figure 4 – Current state of kindergarten



Figure5 – Reconstructed kindergarten

In addition to the functional requirements it is considered energy-efficient aspect through the analysis of three energy classes:

- energy class C - characteristics of energy-efficient (standard) house,
- energy class B - characteristics of low energy house,
- energy class A + - characteristics of passive house.

For these classes, according to the EU regulations, are given reference values of energy indicators (U-values) which shall be achieved appropriate restoration measures.

Basic parts of a building that influence on energy consumption are walls, windows and roofs. In order fully understand their role and significance it is necessary to understand one of the most important concepts in the energy efficiency of a building, it is U-value [3].

In this reserach is made study solar insolation, they are calculated the U-values, heat losses and on which are proposed the energy efficiency measures of building kindergarten:

- setting thermal insulation of envelope object (walls, floors, roof),
- new windows and doors instalation,
- analysis and improvement of the entire heating system.

Conclusions with recommendations for planners and local government in B&H

Based on the analysis of the current situation, measures are proposed and for the proposed measures is given the framework priced bill of quantities for each energy class. It is calculated energy savings per year and payback period of investment. On the building are applied minimal intervention in order to achieve the minimum requirements for energy efficiency. Space of kindergarten has increased in order to create a better and more comfortable conditions for children. However, although they are applied minimal interventions on the building, they can not pay off in a relatively short period of time. Research showed that the building has not the potential for reconstruction and its function is not adequate.

This research shows that investing in such facilities is not profitable and can be applied to other similar, old and dilapidated buildings that have not a monumental and architectural value. In Banja Luka, there are a lot of such buildings which are destroyed, they are in poor condition, have not adequate conditions, and in such buildings people stay. This shows that the necessary emergency interventions in terms of identification, classification and testing energy efficiency based on which objects will be ranked according to importance, purpose, necessity of intervention and etc. It is positive that last year in the Republic of Serbian was adopted the law about energy efficiency but waiting for its implementation build new facilities that meet not energy requirements and energy sources exhaust.

It requires therefore to react in order to rehabilitate existing buildings, and then build a new one. Given the long period of profitability for old buildings investors are not interested. Therefore, it is necessary to implement the law and bylaws which would determine the reconstruction direction of existing facilities and then build new buildings

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Figure 2 http://www.ytong.ba/ba/docs/energetska_efikasnost_u_bosni_i_hercegovini.pdf

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INFLUENCE OF URBAN FORMS AND THEIR CHARACTERISTICS ON CYCLING WITH A FOCUS ON BIKE-SHARING SYSTEMS, CASE STUDY OF THE CITY OF BARCELONA (SPAIN)

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ABSTRACT

Bike-sharing systems in last decades became spread worldwide and very popular mode of transport in all cities where they were installed. This research is focused on Barcelona and its bike-sharing system called Bicing, installed in 2007. Since 2010 number of users is declining, and at the same time financial debts are increasing.

Bicing until today was analysed according to economic aspects of its functioning and on a city level. This research brought novelty to Bicing analysis in a way that its functioning is examined in spatial, urban and social aspect, i.e. the effect of city's neighbourhoods' urban and social characteristics on Bicing users and their will to use this bike-sharing system more or less often. Besides that, it was analysed how urban and social characteristics of different parts of Barcelona affect Bicing users, and which obstacles are users dealing with according to the features of the location where Bicing is used.

The data used in the research were obtained firstly from the literature and experiences of other cities where bike-sharing systems were installed, but also fieldwork data collection included obtaining the information about users, their trip characteristics and characteristics of urban form of different neighbourhoods in Barcelona.

The results of the research showed that Bicing users' and trip's characteristics vary on a part of the city and its properties, but also that bike-sharing systems and biking cannot be analysed on a city level, but it is necessary to dig deeper into the neighbourhood level in order to obtain detailed view of any system's functioning. The research ended up with recommendations and directions for an eventual improvement of Bicing, but also other bike-sharing systems that face similar issues related to urbanism.

KEY WORDS: Barcelona, bike-sharing systems, frequency of usage, functioning, urban forms.

INTRODUCTION

The city of Barcelona as the second largest city in Spain has undergone a radical transformation in the last decades: its economic base, social structure, the population's habits and its urban structure (Marshall, 2004). The urban changes that took place in Barcelona had reflection on transport and traffic in general, in a way that existing infrastructure was reconstructed and expanded, but also new modes of transport were introduced. These transport novelties can be seen in new metro, tram and bus lines all over the Barcelona metropolitan region, but the most recent new mode of transport is bike-sharing system Bicing (Marshall, 2004).

BIKE-SHARING SYSTEM AND BIKING IN BARCELONA

The bike-sharing system called Bicing, placed in Barcelona, was introduced in 2007. Bicing started with 14 stations and 200 bicycles, developing every year, and resulting in 400 stations, 6.000 bicycles and 190.000 users today (Mut, 2010). In Barcelona there are 30 million bike trips annually, from which 40% are made using Bicing (Mut, 2010).

The functionality of the Bicing system is based on a short-term bike usage and it is mainly focused on covering small and medium distances within the Barcelona city area.

Usage of Bicing bike-sharing system varies depending on different areas of the city. This system in Barcelona so far has been analysed only on economic aspects and only on Barcelona's metropolitan area level, without getting deeper into the problem and defining it according to different urban forms of Barcelona and their characteristics. The novelty of the current research relies on the analysis of the Bicing according to spatial, urban and physical characteristics of three typical urban forms of the city. These typical urban areas are different between each other according to their spatial characteristics (size of bike lanes if present, location and distribution of stations of the public transport), social features (trip purposes, density and fluctuation of people and bikers, social structure of the users) and physical properties (location and distribution of Bicing stations, amount and capacity of the stations).

RESEARCH PROBLEM, OBJECTIVES AND QUESTIONS

RESEARCH PROBLEM

The bike-sharing system in Barcelona, Bicing, operated with success until 2010 when problems in the system's functionality started to occur. From then until now, annually the number of users declined and at the same time, financial debts were increasing which is considered as **disfunctionality**. The Bicing system concept was taken from Lyon's bike-sharing system which, in Lyon, works very good (Mut, 2010). If it is taken into account that the same company manages both bike-sharing systems, it is very intriguing why it does not function properly in the Catalan capital.

So far, there are several explanations related to an economic disfunctionality of the system, but none related to urban and spatial aspects and their eventual combination

The aim of this research therefore is to explore as much as possible the spatial and urban factors that influence Bicing's (dis)functionality. At the same time, its goal is to put obtained results into an urban form context and investigate whether urban form related factors could explain some of the problems, according to Barcelona's typical urban areas.

In the end, the research should end up with recommendations and possible solutions not only for Bicing but also for bike-sharing networks worldwide.

RESEARCH OBJECTIVES

GENERAL OBJECTIVE

1. To identify urban, spatial and physical factors that can explain the functioning of Bicing

SPECIFIC OBJECTIVES

1. To create a ranking of the factors by their influence related to the system's functioning
2. To define the factors and users characteristics
3. To develop recommendations for system improvement

RESEARCH QUESTIONS

GENERAL OBJECTIVE

- Which are the factors that influence the functionality of Bicing?
- Which factors have the biggest effect on Bicing and where?

SPECIFIC OBJECTIVES

- **Objective 1**
 - Which factors and aspects are most related to Bicing's functionality?
 - Which factors are chosen for further research?
- **Objective 2**
 - What are the spatial and urban factors' characteristics?
- **Objective 3**
 - What are possible recommendations for improvement of the functionality of Bicing?

CONCEPTUAL FRAMEWORK

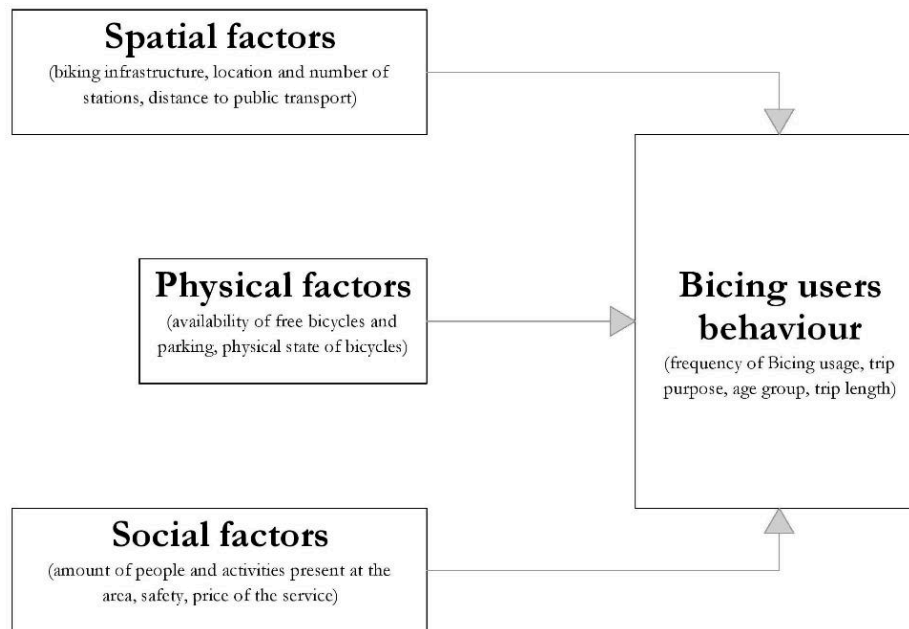


Figure 2. Conceptual framework

The conceptual framework of the research relies on a deep analysis and combination of spatial and urban aspects that have influence on behaviour of current users of the Bicing bike-sharing system and their will to use this system more or less often. These mentioned aspects, as shown in Figure 1 have enormous effect on Bicing users and their mutual influence cannot be left out during analysis of Bicing. In this research it will be shown how characteristics of urban, spatial and physical aspects in different parts of Barcelona affect Bicing users and define characteristics of their trip made using this bike-sharing system.

LITERATURE REVIEW

In many studies there are defined large groups of factors affecting bicycle and bike-sharing use. These factors range from the built environment characteristics (urban form, infrastructure, facilities) to factors related to the natural environment (topography, seasons, climate and weather), social and psychological factors (attitudes and social norms, ecological beliefs, habits), and other factors related to cost, travel time, effort and safety (García-Palomares, Gutiérrez, and Latorre, 2012).

SPATIAL AND URBAN ASPECTS OF FUNCTIONING OF BIKE-SHARING SYSTEMS AND BARCELONA

For successful functioning of any bike-sharing system it is crucial to define appropriate locations of system's stations, especially in relation public transport network which can be integrated physically and operationally with bike-sharing system (Midgley, 2011). In this case, bike-sharing system becomes a complementary mode within public transport system because it extends the radius of influence of the stations, both public transport and bike-sharing system's (Martens, 2007). According to that, bike-sharing stations should not be located more than 500 m from important traffic origins and destinations, but also number of stations and their capacity should be considered during their allocation (Romero, Ibeas, Moura, Benavente, and Alonso, 2012).

The neighbourhood characteristics like street type, density, "cycle friendliness" and accessibility of shopping facilities also influence the number of trips made and their length (Schepel and Zuidgeest, 2009). According to that, Faghih-Imani et al. (2014) state that increased number of restaurants (and similar facilities) at certain area results in an increased usage of shared bicycles, especially in the afternoon and evening.

Land use pattern, urban structure and bike-sharing are co-dependent and mutually influence each other in a complex and dynamic way. Meng, et al. (2014) state that higher density of commercial activities and work facilities at some location encourage cycling at that area. One of the urban structures that are very suitable for bike-sharing systems is

polycentric pattern, which can be found in Barcelona. This type of urban form has the advantage of integrating different functions and activities at one location, so local population (in this case bicycle users) do not have to travel a long way to reach their daily or weekly needs, like shopping, work or recreation (Meng, Koh, Wong, and Zhong, 2014). According to that, users of bike-sharing systems are influenced by built environment and urban structure in that way that bikers are more encouraged to bike as the amount of available destinations increases within available time and space (Marquet and Miralles-Guasch, 2014). Retail and service density, and urban location all relate to the average separation between residences and potential destinations, suggesting that distance plays an important role in explaining transportation bicycle use (Handy, Xing, and Buehler, 2010).

Midgley (2011) in his studies emphasizes the importance of bicycle infrastructure that enables bike-sharing users to cycle safely and continuously throughout the area covered by the bike-sharing system. At the same time, biking infrastructure not only provide safe and continuous bicycle usage, but also it encourages people to use bike-sharing system in their town (Faghih-Imani, Eluru, El-Geneidy, Rabbat, and Haq, 2014). Stated preference studies almost uniformly found that both cyclists and non-cyclists preferred having bike lanes to riding in mixed traffic (Pucher, Dill, and Handy, 2010). Not only biking infrastructure, but also better street connectivity, retail density and land use are associated with increased usage of shared bicycle and bicycles in general (Frank, Bradley, Kavage, Chapman, and Lawton, 2007). Pucher, et al. (2010) considered reducing maximum speed limits for motor vehicles increase bike-sharing usage in two ways: by increasing the speed of bicycling, and by increasing the safety of bicycling. Most studies show increased bicycling with lower automobile speed limits.

Mixed land uses are also an important characteristic, especially with a commercial structure marked by small retail businesses. On average, every square kilometre contains up to five educational institutions, as community facilities and public provisions cover 10% of the total surface area (Marquet and Miralles-Guasch, 2014).

RESEARCH DESIGN AND METHODOLOGY

Research related to bike-sharing systems that combine spatial and urban factors of its functioning, and at the same time, putting them into a specific urban context has not been done so far. As described before, this research is a novelty by itself, which means that a specific research methodology had to be developed. The methodology explains how the data were collected, analysed, connected (merged) and represented as a result.

STUDY AREA

As the Barcelona's bike-sharing system Bicing has been analysed so far only on a city level, this research will focus on neighbourhood levels of the city. This means that (three) different parts of the city will be put in focus, or more precisely, aspects of functioning and usage of Bicing will be analysed according to spatial and urban characteristics of the mentioned areas of Barcelona.

The first area represents the old urban form of the city (neighbourhood **GRÀCIA**). Gràcia's spatial characteristics are that it has organic urban form, narrow streets and roads whose usage is mixed between vehicles, bicycles and pedestrians. The majority of the functions include collective housing and partly business areas. A circulation of people is high and its social structure is diverse, since the population density is high. Bicing stations are not densely distributed.

The area called **PLAÇA DE CATALUNYA** is located in the centre of the city, it represents the main traffic point surrounded by educational, business, cultural and touristic values. Population density and people and traffic fluctuation is high. At this area bike lanes partly exist. Bicing stations are relatively densely distributed.

MAGÒRIA is the part that represents the suburbs of the city where fluctuation of people and vehicles are low, as well as population density. Magòria mostly consists of housing and green areas. Bike lanes are only partly present, and Bicing's stations are sparsely distributed in the area.

OPERATIONAL PLAN

Answers to research questions were obtained firstly from literature and secondly from official sources related to Barcelona's specific case. Since some research questions needed to be answered and/or complemented by additional data, extra information was obtained from the fieldwork. The answer to all research questions were gotten by merging and connecting literature and fieldwork data. However, certain research questions were answered exclusively by fieldwork data collection.

Questions that requested both literature and fieldwork data were answered by firstly, setting assumptions or drawing temporary conclusions obtained from literature information. Secondly, mentioned assumptions were accepted, rejected or modified using fieldwork data resulting in final answers.

Merged pre- and fieldwork data were used to continue with the research that resulted with answered research objectives and questions. Finally, the research also presents recommendations and directions for Barcelona's bike-sharing system, but for other systems worldwide as well. In Table 1 it is shown for which objectives were used which methods and data.

Table 1. Objectives, their methods and purpose

OBJECTIVE	METHOD	METHOD PURPOSE	REQUIRED DATA
Identification of urban, spatial and physical factors	Literature review, later complemented by additional data from fieldwork	To define factors that influence functioning and usage of Bicing bike-sharing system	Literature data related to factors that influence usage and function of bike-sharing systems worldwide, especially in Barcelona
List, ranking and choice of factors	Firstly literature was used to rank and choose preliminary factors which were assessed by survey respondents for final choice and ranking	To identify relevant factors that have the strongest influence on usage and functioning of Bicing bike-sharing system	Information about relevance and effect of factors on bike-sharing systems. Rating of factors by Bicing users.
Characteristics of factors and users	Combination of literature data and fieldwork data collection and/or exclusively literature or fieldwork data. GIS analysis.	To define characteristics of factors that were chosen for further research. To analyse social structure of users of the Bicing.	Qualitative and quantitative data related to factors' features and characteristics of users and their usage of Bicing. Base maps of city locations.
Recommendations for system improvement	Analysis of Bicing bike-sharing system and its features.	To point on weak points of the system and present ideas that can lead to improvement of the system and increased number of users.	Results of this research.

DATA COLLECTION AND DATA PROCESSING

The spine of the research is definitely literature. In this particular case, crucial information and data were obtained from literature related to: bike-sharing and biking in general, basic and advanced conditions for their successful functionality, experiences from other bike-sharing systems, and of course specifications to Barcelona's biking characteristics, Bicing and urban and spatial features of the city. Among found information and data, a filtering has been done in order to select relevant information for the research data for bike-sharing systems and Barcelona case. Three typical urban forms of Barcelona are chosen according to their different characteristics: spatial (spatial, physical and urban features) and social (social structure, population density, circulation of people).

Besides literature, data collection also includes fieldwork data collection (Figure 2). Data collection on the field (in situ) is explained in the next chapter.

Data sources were official and relevant scientific sites, books and articles related to biking, bike-sharing and Barcelona. Besides that, many data were obtained from Barcelona official sources like City council (Ajuntament de Barcelona), Cartographic and geologic institute of Catalonia (Institut cartogràfic i geològic de Catalunya) and Bicing's official website.

Necessary data also included maps and graphical presentations of city locations, their characteristics and infrastructure level and quality. Some of the data related to previous studies that is not available to public, were obtained from Urban department of City council (Ajuntament de la Ciutat de Barcelona) and Autonomous community of Catalonia (Generalitat de Catalunya). Graphical information is supplement to complete research and its parts, but also it provides better understanding of much information stated in the paper.

An important part of spatial analysis of the Bicing system was made using GIS tools. In ArcMap software spatial relation between Bicing stations and public transport stations was analysed and presented graphically. According to maximum walking distance of 500 m between public transport stations and other points of interest (in this case Bicing stations), **buffer** tool was used to show the coverage of the areas by public transport stations, i.e. to show if Bicing stations were located appropriately according the location of public transport stations. For a stations density, analysis tool **point density** was used, with stations radius of 250 m. The purpose of this analysis was to show how stations are distributed across all three areas, as one the important element for functioning of any bike-sharing system.

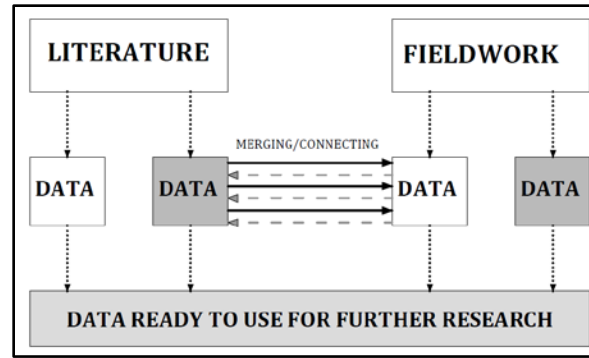


Figure 3. Concept of data collection and processing

FIELDWORK DATA COLLECTION

PURPOSE OF THE SURVEY

The main purpose of the survey was to get an insight into Bicing's functioning quality and to obtain information on what are the biggest obstacles for users of this bike-sharing system, as well as suggestions for improvement of the system. Besides that, the survey shows the basic characteristics of the surveyed users and the main features of the trip made.

Also the results of the conducted survey show which elements have the biggest negative effect on users depending on the location in the city and their spatial and urban characteristics.

CHARACTERISTICS AND CONDUCTION OF THE SURVEY

The survey consisted of three parts: evaluation of presented socio-spatial elements by users, suggestions on what should be improved and a third part which involved characteristics of a user and a trip.

An evaluation of the factors was made by users where is given them an opportunity to mark each of the factors on a scale from 1 to 5. In this case, grade 1 means that an element has no negative effect on Bicing users, while 5 is considered as very negative, or simply said, as an obstacle for this particular user.

The second question was an open one and the respondent was asked to give an example of what could be improved and make them use this bike-sharing system more often.

The final part analysed the respondent as a user of Bicing and the characteristics of the trip made by Bicing. Example of one made survey is in appendix 1.

Some questions were different depending on the location in the city and its characteristics. Questions will be described in detail in further text.

The survey was conducted in Catalan and Spanish (Castilian), as official languages in Autonomous community of Catalonia.

QUESTIONS IN THE SURVEY

The first part in the survey consisted of grading the factors by Bicing user. The exact question was: **Which elements limit you from using Bicing more often in this area?**

The aspects presented were:

Spatial aspects: Presence of bike lanes

Location of the stations at the area

Number of stations at the area

Distance/connection from public transport stations

Social aspects: Functions and activities present at the area

Amount of people present and passing by and through this area

Safety of cyclists

Physical aspects: Availability of free bikes

Availability of free parking slots

Physical state of bicycles

The second question was an open one and it was asked: **What elements would encourage you to use Bicing more often at this area?**

The third part consisted of characteristics of user and trip. A user was asked to provide the information about their **age**, **trip purpose**, **trip length**, **frequency of usage per week** and **sex**.

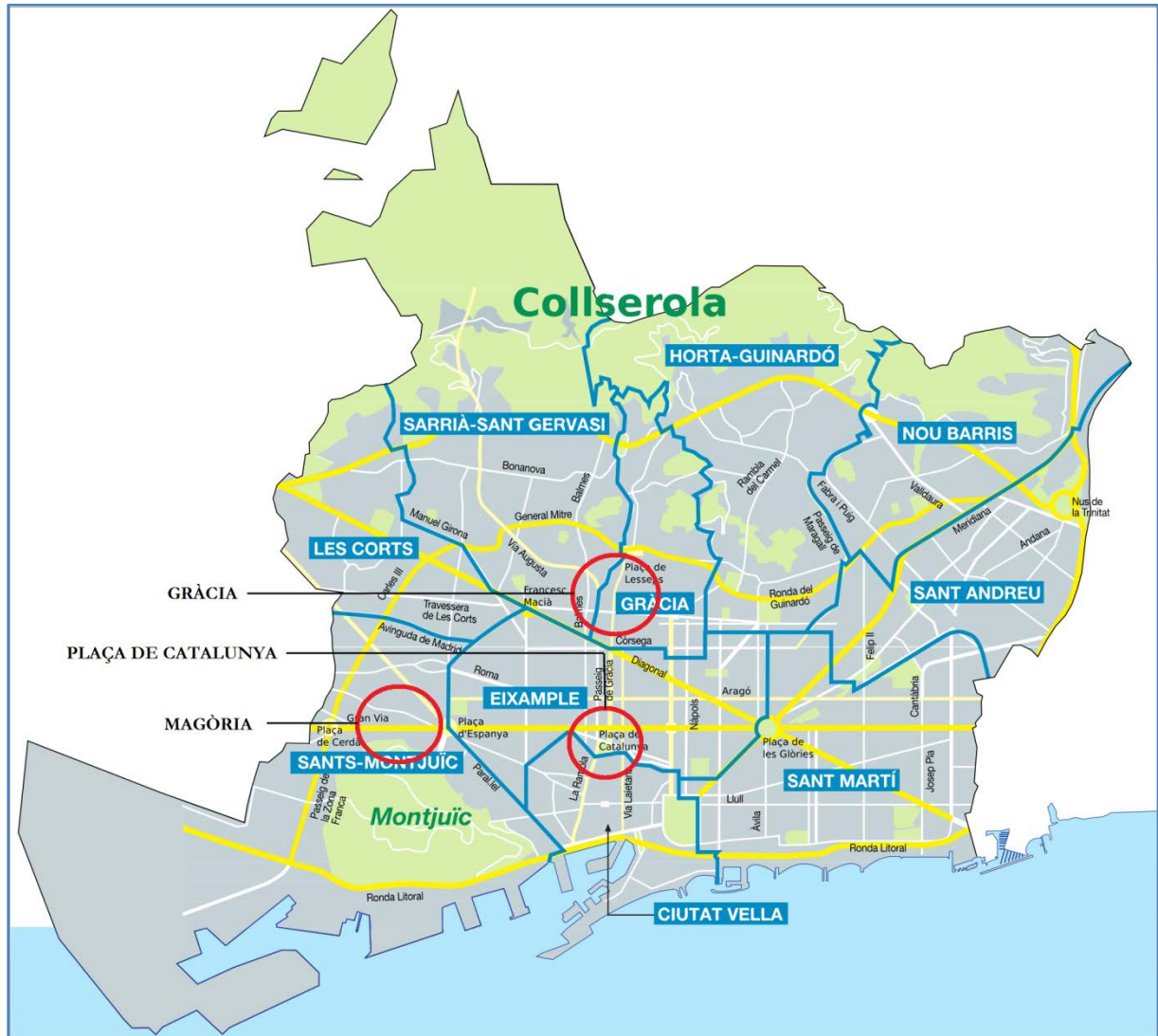


Figure 4. Districts of Barcelona metropolitan area and study areas (source: www.bcn.cat)

CHARACTERISTICS OF BARCELONA'S URBAN FORMs

GENERAL INFORMATION AND FOUNDATION OF TODAY'S URBAN FORM

The Barcelona region is consisted of 162 municipalities, in an area of approximately 3 200 km² and a radius of 55 km (Garcia-López and Muñiz, 2012). The city is characterised by compact urban structure, with high densities present in the region. Land uses, as an important factor, are mixed and marked by small retail businesses and commercial activities (Marquet and Miralles-Guasch, 2014).

Urban surface of Barcelona exceeds the administrative city border, and with a population of approximately 4.5 million, The city itself covers the area of 101 km². 120 kilometres divides Barcelona from Pyrenees and the Spanish border with Republic of France (INE, 2012).

The topography of Barcelona is diverse and consists out of plane areas near the coast and hilly parts increasing from the coast in direction of the north. The central business district of the city occupies the plane part, while the hilly parts mainly consist of collective housing and individual housing in the northeast (El web de la ciutat de Barcelona, 2015). The importance of topography and slope percentages for biking will be explained in the further text.

CHARACTERISTICS OF PLAÇA DE CATALUNYA

URBAN CHARACTERISTICS OF PLAÇA DE CATALUNYA

The central business district in the city of Barcelona is located at this area: Plaça de Catalunya. It is a main crossing point of all transport and traffic directions, as well as a meeting point of citizens and, especially, tourists.

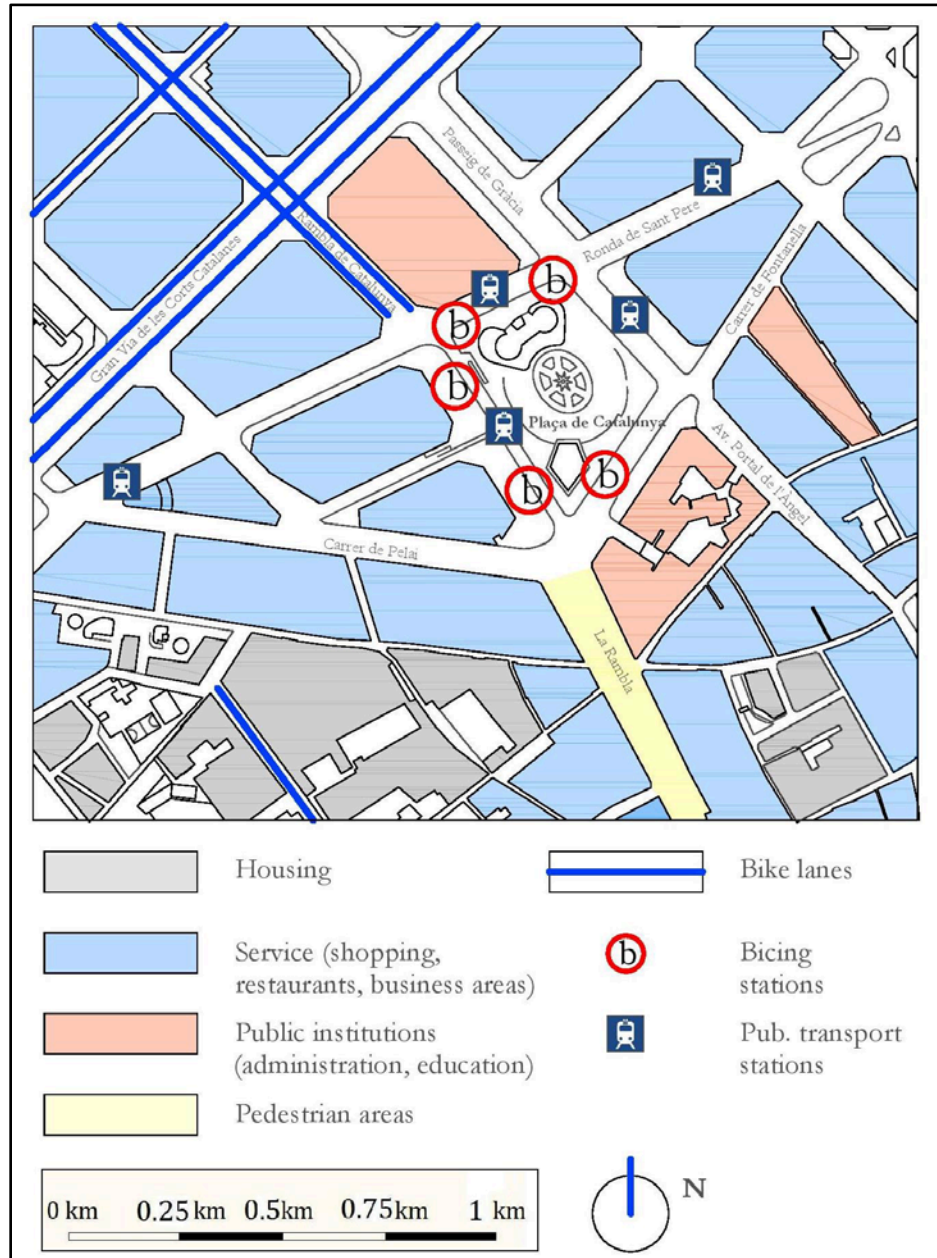


Figure 5. Plaça de Catalunya (own elaboration, base map source: www.icc.cat)

Related to **traffic and transport infrastructure**, this location and its main square (Figure 6) is surrounded by two-lane roads (Ronda de Sant Pere on the north, Carrer de Fontanella on the south, Avinguda de Portal de l'Àngel on the east, and streets Bergara and Pelai on the west of the square), pedestrian paths (La Rambla, Rambla de Catalunya and Passeig de Gràcia), but also there are pavements for pedestrians on both sides of the roads. Bike lanes are hardly present in this area, i.e. they are built north of the square along with streets Gran via de les Corts Catalanes, La Rambla and Rambla de Catalunya. These are the only locations with bike lanes.

Public transport in this area provides the spine of the city's traffic connectivity. Plaça de Catalunya contains stations of all public transport modes (metro, bus, train and tram) and also stations of Barcelona's bike-sharing system **Bicing**. From this location it is possible (sometimes it is the only way) to reach all parts of the city and the wider region by any types of transport ("El web de la ciutat de Barcelona," 2015.).

Five stations of **Bicing** are surrounding the square making it accessible from all directions of the city.

This location representing the central business district of the city is filled with **tertiary economic activities and functions**, i.e. the main activities at Plaça de Catalunya are banks, business centres, shopping centres, educational institutions and touristic info points. These activities are affecting the purposes of trips of people using different modes of transport. Accordingly, this location is most of the time characterised by an enormous circulation of people and traffic participants.

The terrain of Plaça de Catalunya is mostly flat, with a slight inclination towards the sea side in the south. In general, it is completely suitable for all types of transport, also the bicycle since cyclists generally dislike going up inclines of more than 5 per cent and avoid inclines greater than 8 per cent (Midgley, 2011).

RESULTS OF THE RESEARCH AT THE PLAÇA DE CATALUNYA

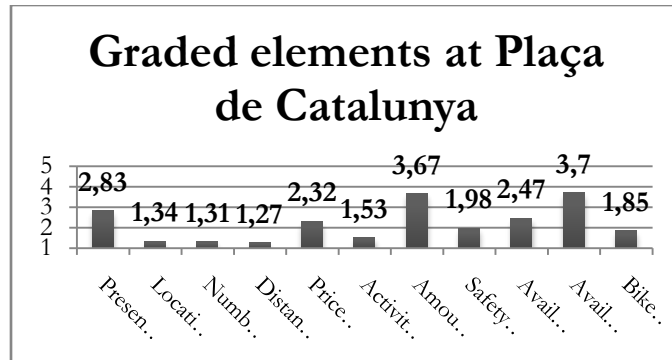


Figure 6. Average grades of the factors, graded by the respondents (Plaça de Catalunya)

After grading of the different factors by respondents of the survey, at this area the biggest obstacles for users of Bicing are: **availability of free parking slots, amount of people present and passing by the area, and absence of bike lanes** (Figure 7).

The availability of free parking slots is the biggest issue for Bicing users according to the survey. This problem is very important since in case of unavailability of parking and exceeding 30 minutes of usage of the system a user is obliged to pay a fine. That fact is the main reason why users at Plaça de Catalunya do not use Bicing. When taking into account results of a second (open) question it is clear that users want more time of free usage of Bicing, partly because of the cases of unavailable free parking.

Users are also quite frustrated by the amount of people that are present and that pass by through Plaça de Catalunya, since it is the main traffic and meeting point in the city. An enormous number of pedestrians, tourists and vehicles make biking in general at this area very difficult. At this zone, the majority of respondents in a second (open) question desired that there are less people, and that exactly that would encourage them to use Bicing more often at this area.

Present bike lanes are insufficient for the amount of cyclists, since at many places cyclists are obliged to share the road with pedestrians and vehicles. Bike lanes would physically separate cyclists from other participants in traffic and make biking and Bicing usage easier and more appropriate. This fact was stated by respondents through their answer to the open question the survey. The elements that have no negative effect on Bicing users are distance to public transport, location and number of stations, since this area is surrounded by public transport and Bicing stations and there are five Bicing stations at the zone with capacity of average 27 bicycles per stations.

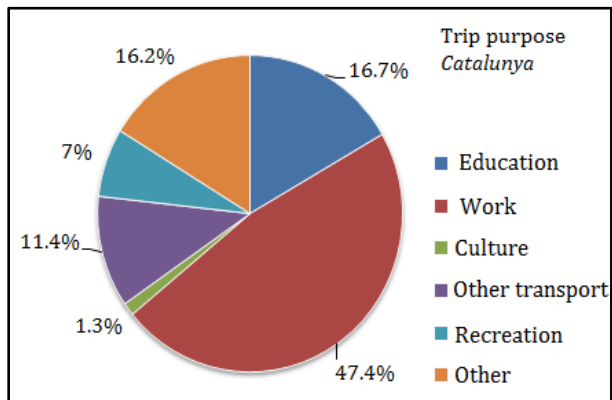
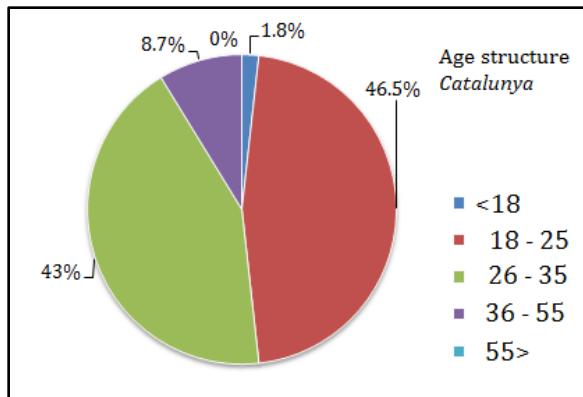


Figure 8. Age structure of users (Plaça de Catalunya)

Figure 9. Age structure

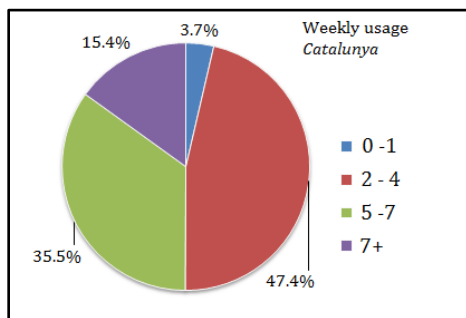


Figure 10. Gender representation (Plaça de Catalunya)

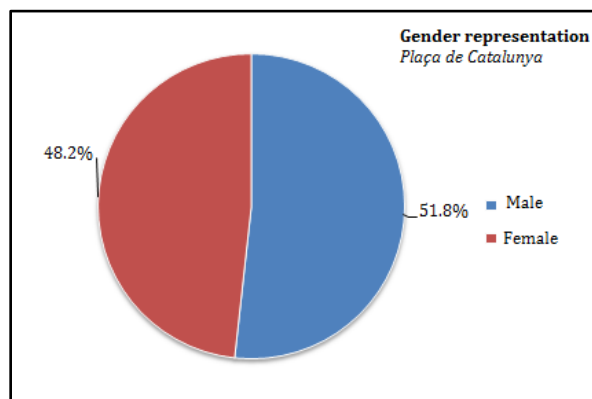


Figure 11. Frequency

After taking a look at the characteristics of users and trips, it is clear that the users of Bicing are young people, mostly between 18 and 35 years of age (Figure 8). Besides that, the main trip purposes of the users are work and education (Figure 9), which is understandable when comparing to major age group of respondents. The users mostly use Bicing several times a week (Figure 10). In this area the average trip length is **15.95 minutes**.

CHARACTERISTICS OF GRÀCIA

URBAN CHARACTERISTICS OF GRÀCIA

Gràcia is the area in the north of the city, which still kept its organic form and tight streets. This location was not included in the big city transformation in the past century. It is a very quiet and peaceful neighbourhood excluded from traffic jams and daily city noise.

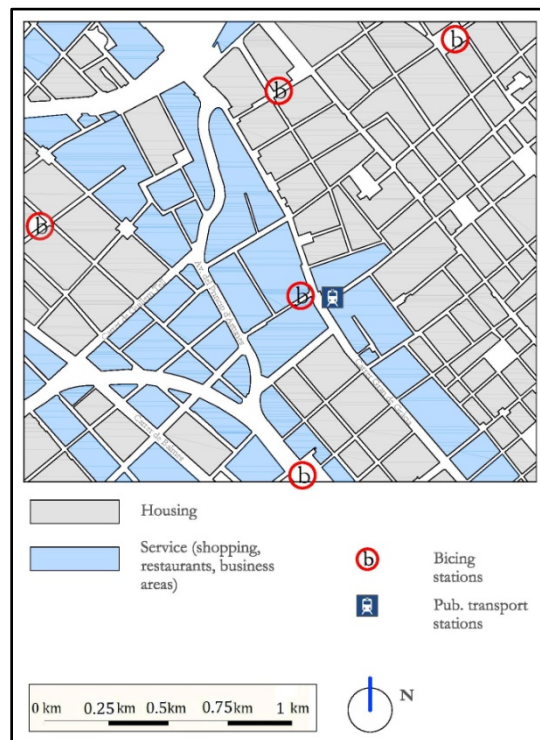


Figure 12. Neighbourhood of Gràcia (own elaboration, base map source: www.icc.cat)

Traffic infrastructure consists of one-way streets with an approximate width of 3.5 m. As is it case in the whole city, pedestrian pavements are present on both sides of the roads. Bike lanes at this area do not exist since the location was not part of urban transformation and in the past this type of infrastructure was neither planned nor built.

Public transport stations are present at this area. Many metro and bus stations are located at this area, even though they are not densely spread and from some parts of neighbourhoods not easily reachable (Figure 12).

Bicing stations are also present, and as the public transport, stations are not densely installed at the area. At the some points they are not easy reachable also caused by Gràcia's topography.

Gràcia is known as a quiet area mostly consisting of **housing and small businesses** (shops, bars). Besides that, this location contains many areas for education, recreation and tourism. This influences trip behaviour of people who mostly go to other areas for business and work, but come here for recreation and fun.

Terrain at Gràcia is diverse. At the locations that are closer to centre (south) the terrain is flat and very acceptable for transport, especially biking. By going towards the north, the neighbourhood's inclination is growing such that at certain point it becomes unpleasant for walking or biking (Figure 13 and 14). That is why cyclists avoid using bicycles at these areas.

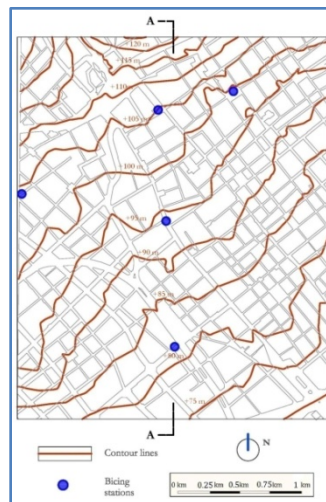


Figure 13. Topography map of Gràcia and Bicing stations locations (own elaboration, base map source: www.icc.cat)

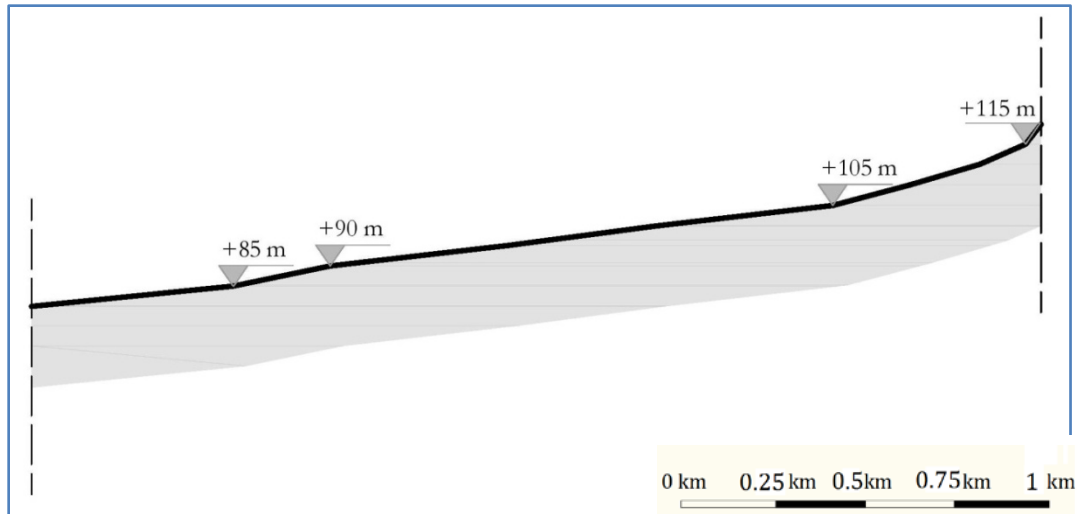


Figure 14. Cross section of topography of Gràc
source: www.icc.cat)

RESULTS OF THE RESEARCH AT GRÀCIA

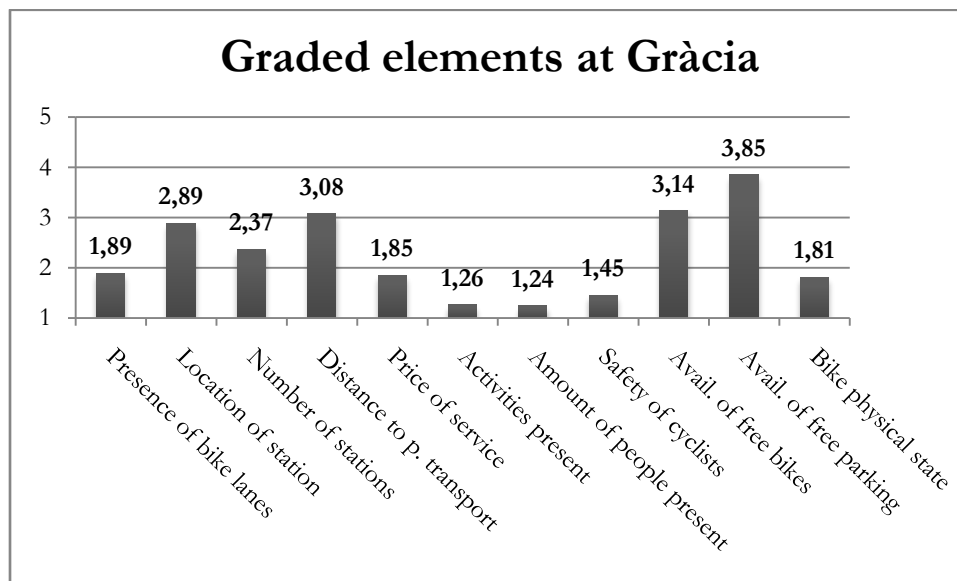


Figure 15. Average grades of elements, graded by respondents (Gràcia)

At this area the elements that have the most negative effect on users are the availability of free bikes and parking, and distance to public transport (Figure 15).

Availability of free bikes and parking slots has two different dimensions discovered through the second (open) question of the survey. Since the neighbourhood of Gràcia has

partly hilly terrain, users mostly complained about unavailability of free parking slots at downhill parts of the area and unavailability of free bikes at the uphill areas of Gràcia.

Distance to the stations of public transport is a huge issue for users, since many Bicing stations are quite far from stations of all types of public transport (metro, bus, and tram).

Since Gràcia is quite a quiet neighbourhood without dense traffic, users find it very pleasant for using bicycles in many aspects like activities and amount of people present at the zone.

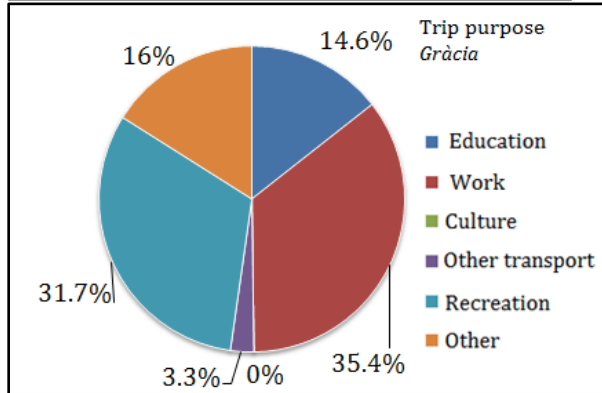
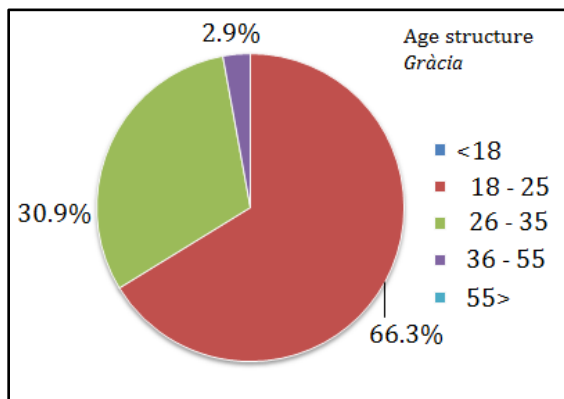


Figure 16. Age structure of users (Gràcia)
purpose of users (Gràcia)

Figure 17. Trip

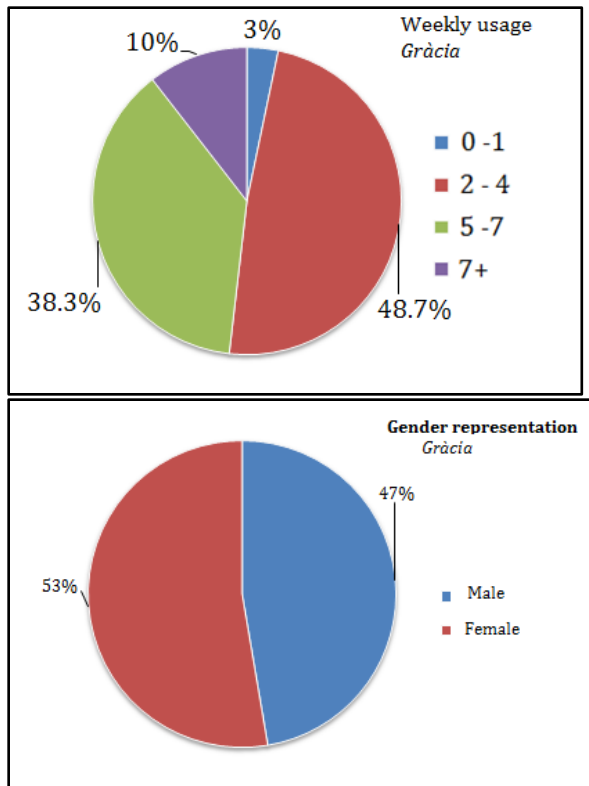


Figure 78. Usage frequency (Gràcia) representation (Gràcia)

Figure 19. Gender

Related to features of users and trips, as in other zones, Bicing is used mostly by young people between 18 and 35 (Figure 16). Trip purpose defers a bit from the previous area, since in Gràcia the main trip purposes are work and recreation/fun, which is expected according to the age group of users (Figure 17). At this zone as well, Bicing is used several times a week (Figure 18), and average trip length is **20.19 minutes**. This is normal since this neighbourhood is a little bit further from city centre and its main activities.

CHARACTERISTICS OF MAGÒRIA-LA CAMPANA

URBAN CHARACTERISTICS OF MAGÒRIA-LA CAMPANA

Magòria – La Campana is the location situated in the west of the Barcelona area, considered as the neighbourhood outside of the city centre. According to that there is no huge fluctuation of pedestrians or bikers, but there is a considerable amount of vehicles at the roads here that connect Barcelona with other areas of the region and province.

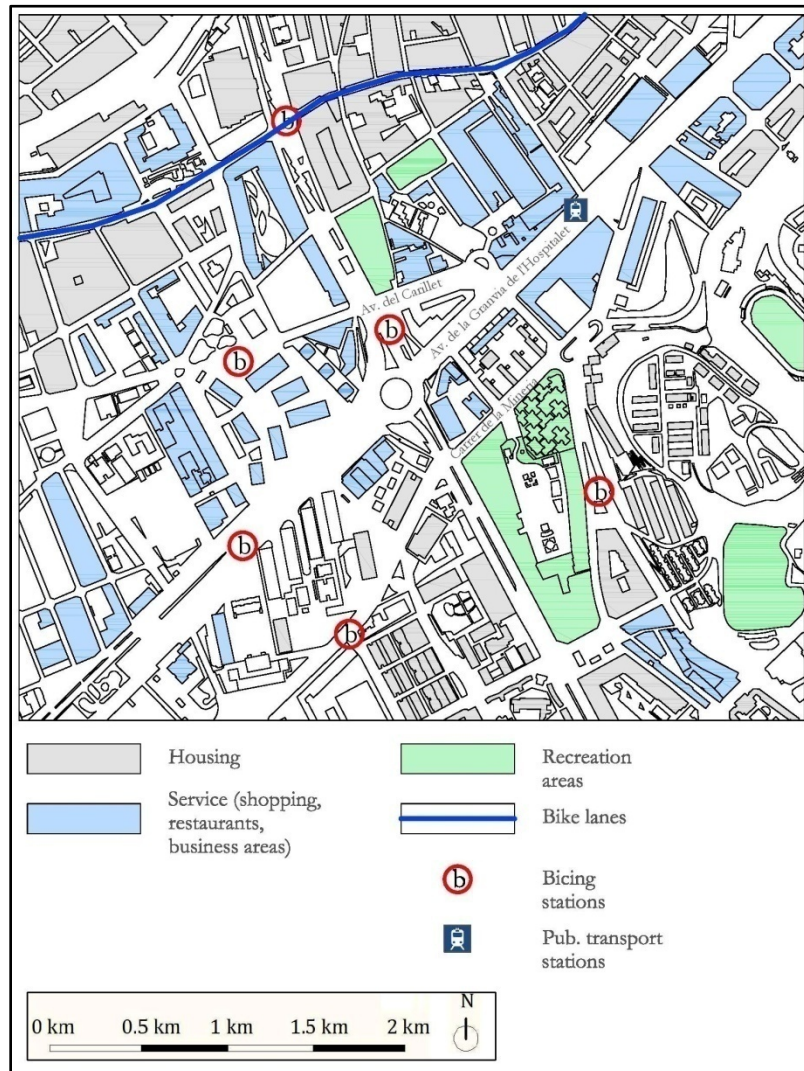


Figure 20. Neighbourhood of Magòria (own elaboration, base map source: www.icc.cat)

Magòria is a very important area since it is the bridge between the city centre and the west part of the suburbs and Catalonia. According to that, **traffic infrastructure** is well developed and through the location there is a high way consisting of six lanes (three lanes in one direction). Besides that, there are other roads followed by pedestrian pavements. **Bike lanes** are present only along the road Gran via de l'Hospitalet and partly at some smaller streets in the neighbourhoods (Figure 20).

Bicing public stations are present and spread over the area, even though not densely which is understandable according to the amount of people present at the location. A few Bicing stations at this location were eliminated recently due to lack of profitability.

Magòria is a location **without rich and diverse activities** present. The area consists of housing, small retail shops and huge roads passing through the neighbourhood. In order to work or study, the population mostly visits other parts of Barcelona's region, at the same time, intentional visitors are rare.

The terrain of Magòria is very pleasant for all kinds of transport and movement (walking and biking). The topography is constant, without changes and hilly parts.

RESULTS OF THE RESEARCH AT MAGÒRIA

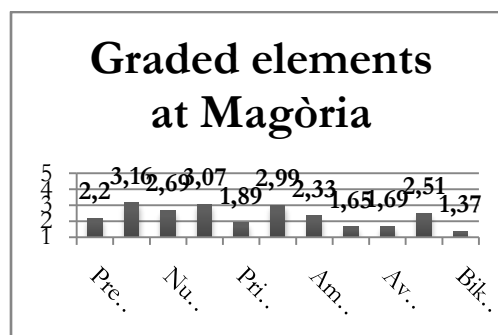


Figure 21. Average grades of factors, graded by respondents (Magòria)

In Magòria the biggest obstacles for Bicing users are the location of Bicing stations, distance to public transport and activities present at the zone (Figure 21).

Since this zone is located relatively far from the centre, two Bicing stations were eliminated; the coverage of the area by Bicing stations is worsened. Magòria mostly consists of housing, green areas and roads, it is clear that there are not many functions and activities that would attract Bicing users to the system here.

According to features of Bicing usage, availability of free bikes and parking are not a big issue at this area.

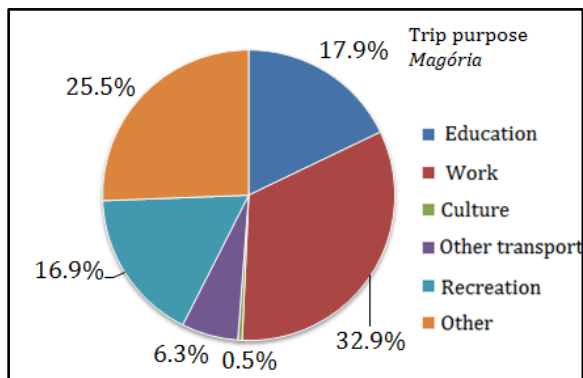
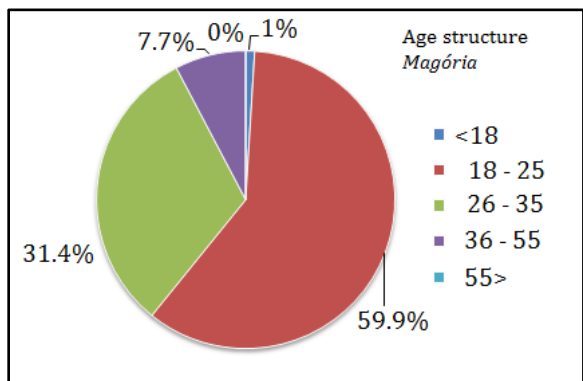


Figure 22. Age structure of users (Magòria)
purpose of users (Magòria)

Figure 23. Trip

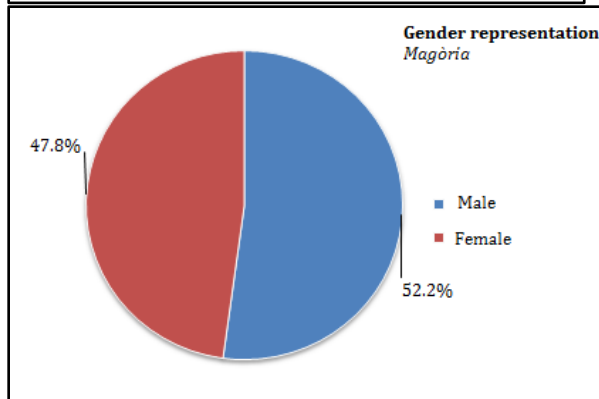
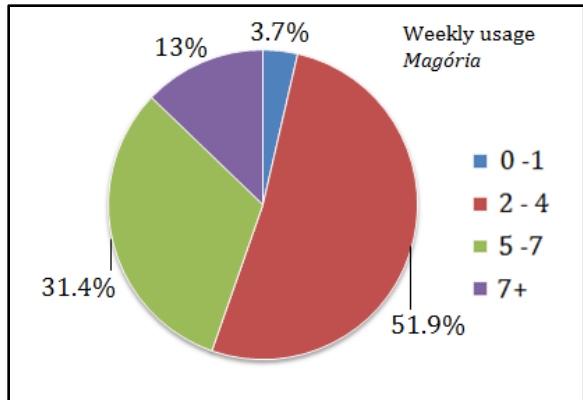


Figure 24. Usage frequency (Magòria) representation (Magòria)

Figure 25. Gender

At this zone, as in previous areas, users are young people (Figure 22) who use this system mostly for reaching to work and education points (Figure 23), several times a week (Figure 24) how much is the average usage of Bicing by respondents. Average duration of trip is **20.99 minutes**.

DISCUSSION OF THE FIELDWORK RESULTS AND BARCELONA'S URBAN FORM

PRESENCE OF BIKE LANES

Bike lanes are a crucial part of any bicycle network infrastructure, and according to that they have an enormous effect on potential and current bicycle users. An aspect that emerges from the literature is that many people tend to declare that they would actually like to use a bike for their daily needs in the city (for example, to

work or to school), but that they may be discouraged by several practical obstacles, such as the absence of cycling facilities and/or the bad quality of existing ones (Passafaro et al., 2014). It is not the network length that matters, it is the fact that such a network exists and is in good repair (Midgley, 2011).

In the city's central business district, known as Plaça de Catalunya, it was shown that the absence of bike lanes present has a negative effect (average grade of 2.83 in survey) on bike users and their will to use both Bicing or private bicycle. In this case, it is closely related to social characteristics of the area, since cyclists require bike lanes to be physically separated from pedestrians and vehicles whose number and intensity are very high, in order to be able to use the bicycle without any obstacles (Figure 26).

At Gràcia the absence of bike lanes got the average grade of 1.89 meaning that it has no big negative effect on cyclists. The reason for this is that even though there are no bike paths, traffic intensity is very low (both pedestrians and vehicles) so Bicing and bicycle users have no problems with using this type of transport.

At Magòria the presence of bike lanes in the conducted survey has an average grade of 2.2 which means that their presence or absence in some parts have important role, still not crucial. Areas that do not have bike lanes at this location force cyclists to share the path with traffic participants that they want to avoid. Since the traffic at Magòria is not intensive, Bicing users in average have big issues with sharing roads with vehicles or pedestrians.

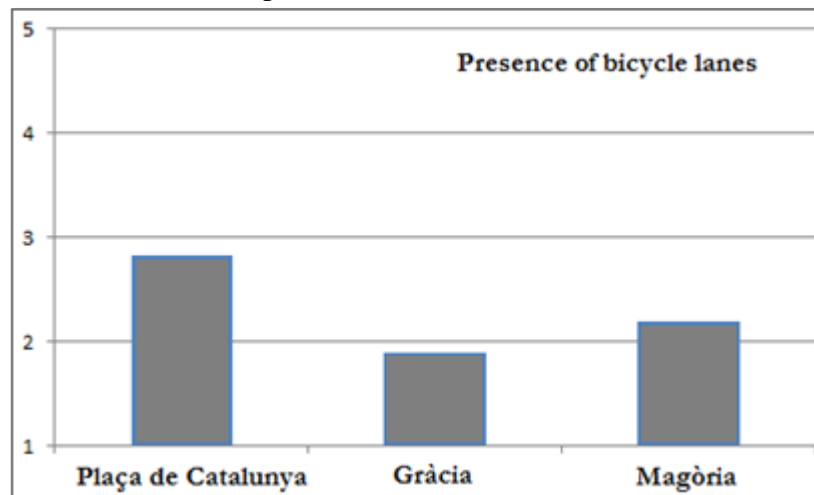


Figure 26. Average grade of presence of bike lanes

LOCATIONS OF THE STATIONS

Urban space is not homogeneous, as locations and places with different gravitational forces draw more, or less, attention from the users of the city. Each social group has its own travel necessities that are unequal and are defined by their

demographic and socioeconomic status. Uneven access to the different modes of transport, clearly, affects travel behaviour and, ultimately, people's travelled distances (Marquet and Miralles-Guasch, 2014). In case of Plaça de Catalunya locations of stations were graded on average 1.34 which means that Bicing users are very satisfied with it (Figure 27). It is understandable since stations at this area are no more than 50 m away from all main roads and paths, business and educational centres, and other important locations for residents, but also stations are densely distributed (Figure 28). At Gràcia there is a different situation where location of stations got an average grade of 2.89 making it a significant negativity of the system here, since stations are not densely distributed (Figure 29), often far from residents' place of living or places of interest (schools, traffic points, and work or recreation points). At Magòria it is even more important, since the average grade is 3.16, making it a significant obstacle (Figure 30).

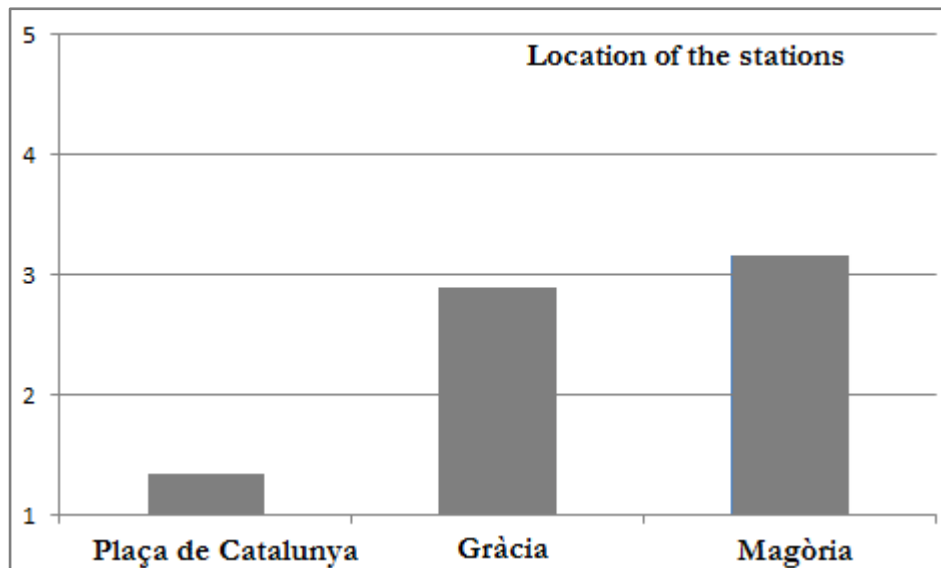


Figure 27. Average grade of locations of stations

The bicycle sharing systems are specially adapted in case of cities with steep slopes because the cyclists can use the bicycle in one direction and use other transport modes (such as buses) for the opposite direction. In these cases the main problem of the bike-sharing system sponsors is the relocation of bicycles that must be carefully designed. The slopes have a negative effect on cyclists' will to cycle, since grades greater than 5% are uncomfortable for many cyclists (because the ascents are difficult to climb and the descents induce excessive speeds), but they may be used in short sections (Frade and Ribeiro, 2014). Locations of Bicing stations are very important since travel distance by mode varies from country to country and city to city, most people are willing to walk up to 10 minutes. In cities with slopes under 4 per cent, topography is not a limiting factor. However, with slopes between 4

per cent and 8 per cent, the topography does become a significant constraint. Cyclists will go down the slope but will refuse to go up. Bicycle-sharing stations at higher elevations will tend to be empty, while those at lower elevations will tend to be filled up (Midgley, 2011). This fact is very evident at Gràcia, whose topography is in some parts inadequate for pedestrians and especially for cyclists.

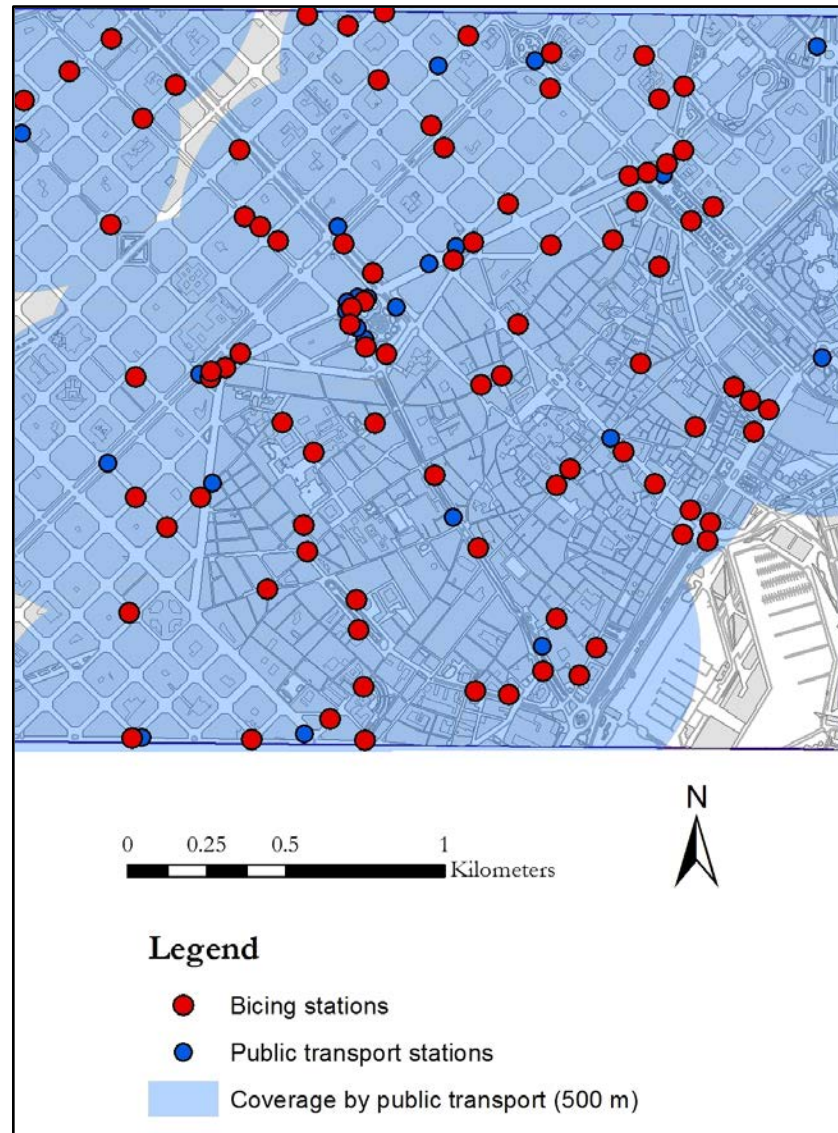


Figure 28. Coverage of Pl. de Catalunya by public transport, walking distance of 500 m (own elaboration, base map source: www.icc.cat)

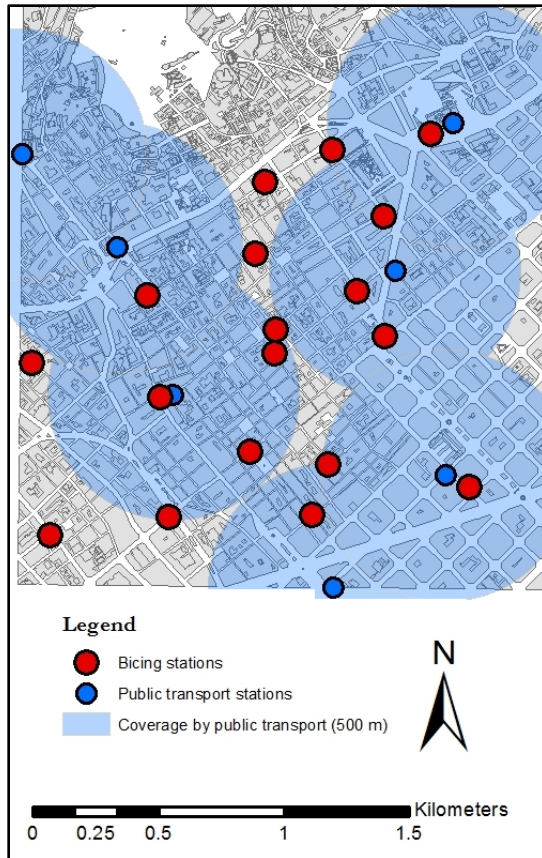
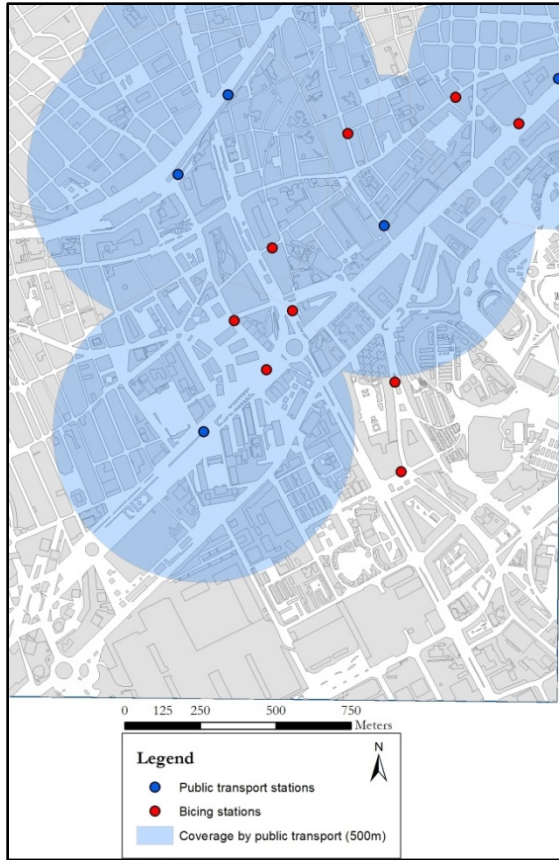


Figure 29. Coverage of Gràcia by public transport, walking distance of 500 m (own elaboration, base map source: www.icc.cat)

Figure 30. Coverage of Magòria by public transport, walking distance of 500 m (own elaboration, base map source: www.icc.cat)



NUMBER OF STATIONS

This element is closely related to density and location of stations distribution and their proximity to points of interest. Existing examples show that the bicycle stations should not be located more than 300–500 m from important origins and destinations of traffic (Lin, Yang, and Chang, 2013). At Plaça de Catalunya number of stations got the average grade of 1.31 (Figure 31) meaning that the number is satisfying and the stations are easy approachable from all sides of the area (Figure 32). The area of Gràcia, related to number of stations, has an average grade of 2.37. This means that respondents in the survey consider that number of Bicing stations is insufficient and that coverage of the area by stations should be improved. At Magòria survey respondents stated by a grade of 2.69 that the number of stations (or at least

distribution) does not satisfy their needs. Figure 32 shows the density of Bicing stations, which is mostly high and as that, stated in the survey results. Bicing stations at Gràcia (Figure 33) are not so densely distributed at the area. Hence, the respondents in the survey in average graded it with medium satisfaction level. At Magòria (Figure 34), among these three locations, Bicing stations are the least densely distributed, which received the highest level of dissatisfaction by the users who participated in the survey.

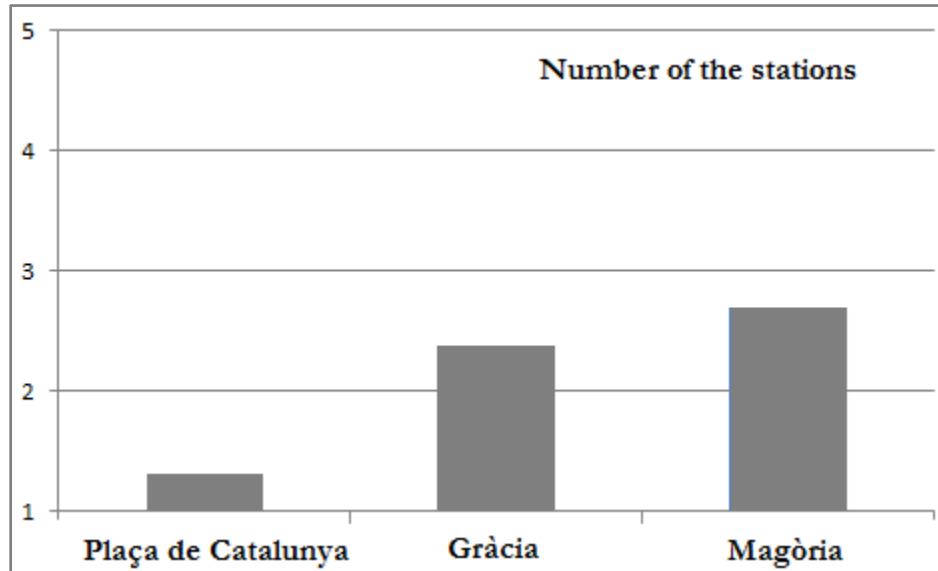


Figure 31. Average grade of number of stations

The number of stations in the central business area is normally higher than in other areas. It is also crucial for the success of the system that users can easily find bicycle stations within a convenient walking distance. The system needs a sufficient number of bicycle stations to be positioned in the right locations for users to take a bicycle near their origins and to park it in a station near their destinations (Lin, Yang, and Chang, 2013).

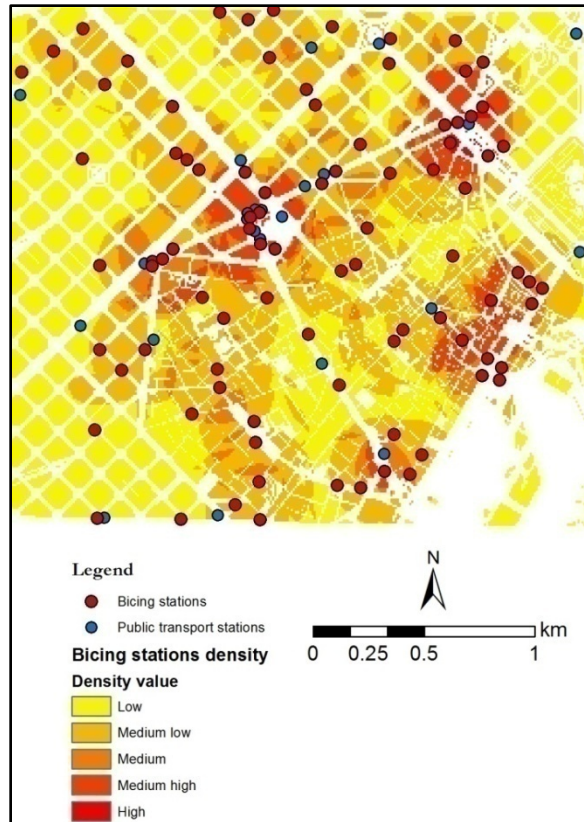


Figure 32. Density of Bicing stations at Plaça de Catalunya (own elaboration, base map source: www.iccc.cat)

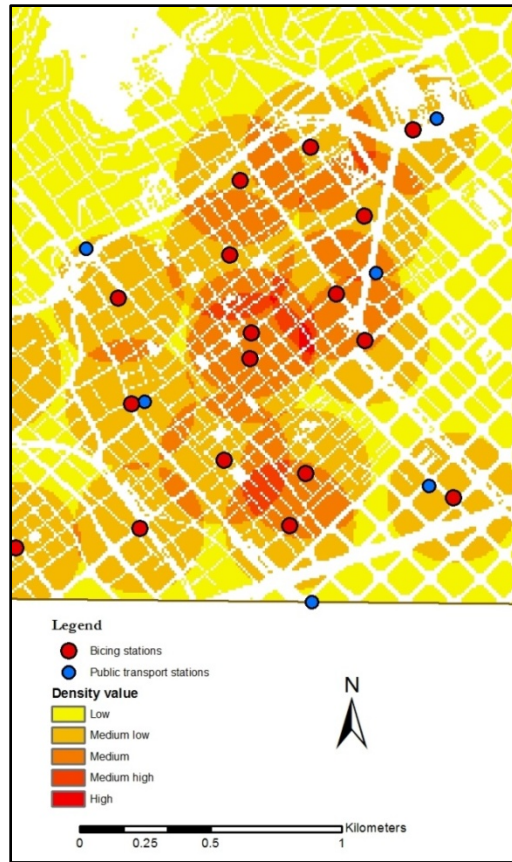


Figure 33. Density of Bicing stations at Gràcia (own elaboration, base map source: www.iccc.cat)

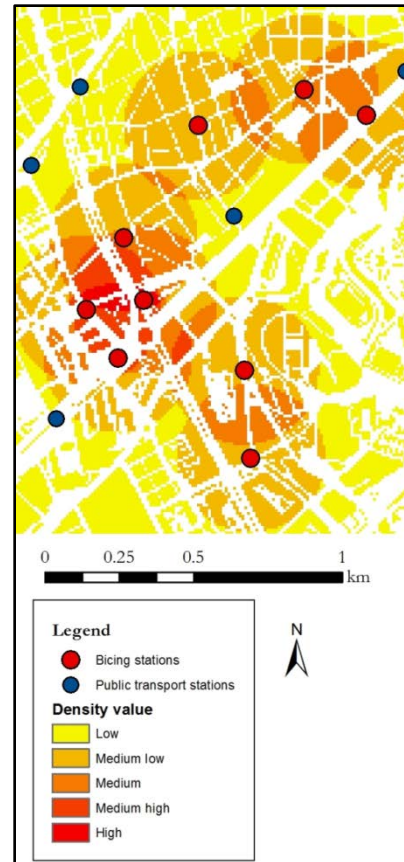


Figure 34. Density of Bicing stations at Magòria (own elaboration, base map source: www.iccc.cat)

BICING COMBINATION WITH PUBLIC TRANSPORT

The location of a public transport stop or station can have a substantial influence on the level of bike-and-ride (Martens, 2004). According to that, the closer the Bicing stations are to public transport stations, the more it will encourage people to use Bicing and combine it with other modes of transport. At Plaça de Catalunya the proximity to public is graded as excellent (1.27) since the area contains stations of all types of public transport in Barcelona, no further than 100 m (Figure 32). At Gràcia the situation is quite worse since public transport stations are poorly distributed over the area, resulting in a grade of 3.08, i.e. combination of public transport and Bicing is not easy to manage. The reason for such situation is that Gràcia is less populated than other neighbourhoods of Barcelona, and that movement of its residents is mostly limited and expected to be inside the neighbourhood. Magòria has a similar grade as Gràcia (3.07) resulting in dissatisfaction of Bicing users by

Bicing stations' proximity to public transport. Urban form and location of Magòria as a transit point within the city results in a lower number of both Bicing and public transport stations, but also their spatial balance.

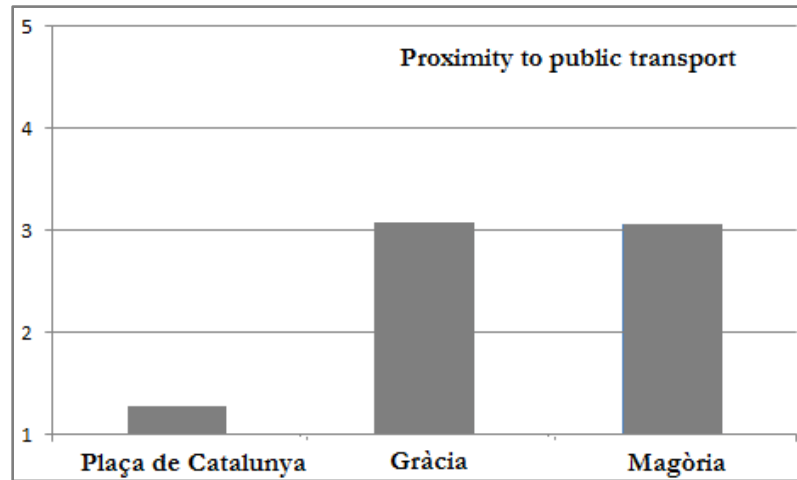


Figure 35. Average grade of distance to the public transport

ACTIVITIES PRESENT AT THE AREAS

Activities and functions at any area sometimes can be very important for attracting people to come to a certain area (Marquet and Miralles-Guasch, 2014). According to that, Plaça de Catalunya offers to its residents many functions and contents, which makes often unnecessary for them to leave the area (Figure 34). That was confirmed by the survey also; where respondents indicate that this location offers them a variety of activities, which was graded with 1.53. The bicycle circulation is expected to decrease when we go farther from central business district, since restaurants, other commercial activities, and universities near a station significantly affects the arrival and departure rates of the bike-sharing system station (Faghih-Imani, Eluru, El-Geneidy, Rabbat, and Haq, 2014). According to the previous statement, it is clear that any location far from Plaça de Catalunya will have less satisfying results related to activities and contents present at a certain location. At Gràcia, the average grade of present activities is 1.26, which is understandable when it is taken into account that the majority of respondents are situated at Gràcia and they find all their daily needs here. On the other hand, 66.3% of users questioned belong to the age group from 18 to 25, and 67.1% of the respondents here use Bicing for recreation, fun and work. Exactly these activities make Gràcia specific and acceptable for this age group and their needs. At Magòria the satisfaction with contents and activities is quite low

(average grade is 2.99), since the majority of daily needs and obligations have to be found elsewhere in the city.

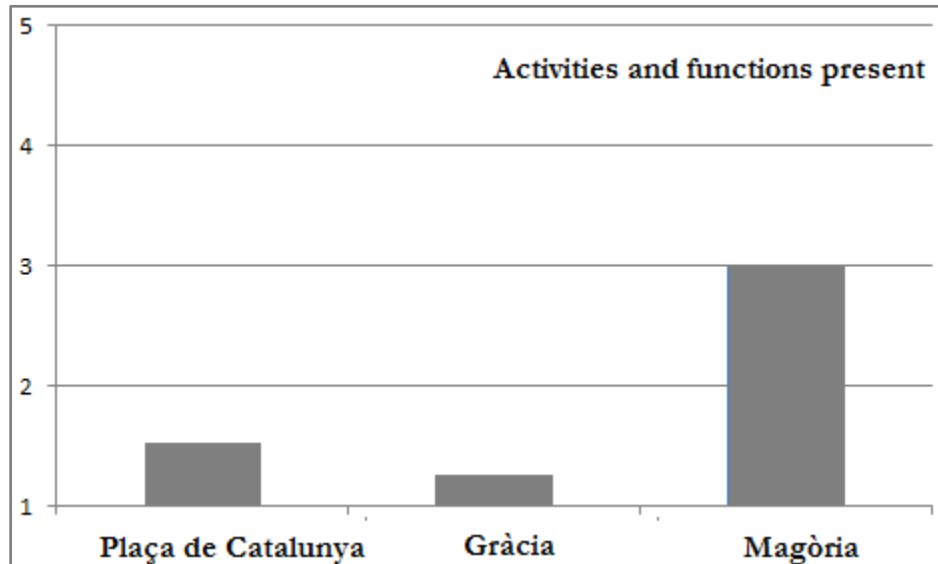


Figure 37. Average grade of the activities present

AMOUNT OF PEOPLE PRESENT AND PASSING BY THROUGH AREA

The amount of people present at any area makes the area attractive until a certain point. Plaça de Catalunya, its urban form and activities makes this location extremely attractive. Here, this element was graded with 3.67 making it very unsatisfying for cyclists and cycling, since that amount of people makes biking at Plaça de Catalunya almost impossible. Besides that, absence of bike lanes that would physically separate cyclists and other people present here, makes this issue very important (Duarte, 2007). Gràcia does not have problems related to the amount of people present, since it is popular as a quiet and peaceful area and obtained the grade of 1.24, as shown on Figure 35. Magòria faces problems related to the amount of people passing by, in this case not pedestrians but the number of vehicles (average grade of 2.33), which is closely related to safety and its perception that will be explained in further text.

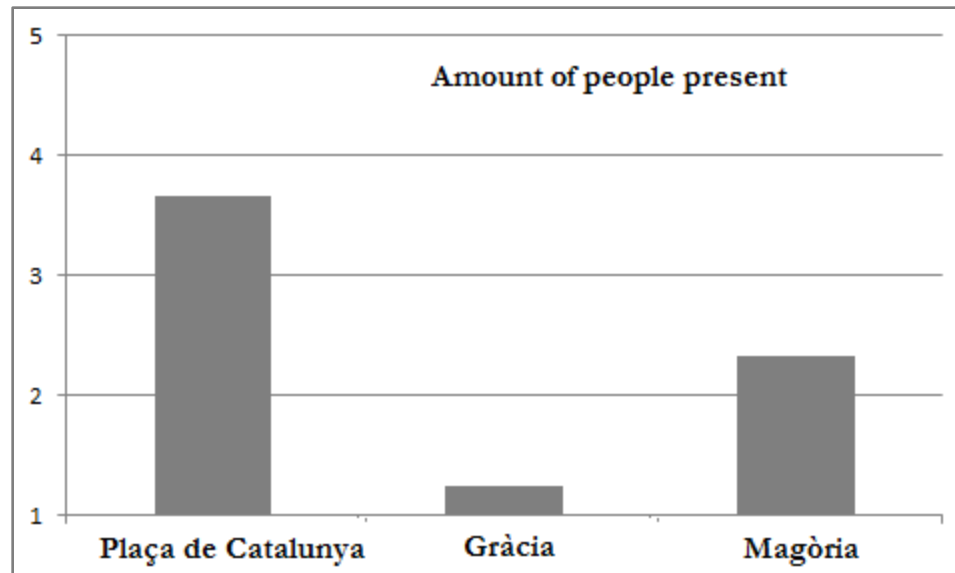


Figure 38. Average grade of the amount of people present

AVAILABILITY OF FREE BIKES AND FREE PARKING SLOTS

The two biggest problems detected, which cause user frustration, are the impossibility to find a bike when a user wants to start his/her journey and the impossibility to leave the bike in the user's destination due to full stations (Kaltenbrunner, Meza, Grivolla, Codina, and Banchs, 2010). In this survey also these two factors are stated as the biggest obstacle for Bicing users. Availability of free bikes got grades (Figure 37) at Plaça de Catalunya 2.47, at Gràcia 3.14 and at Magòria 1.69.

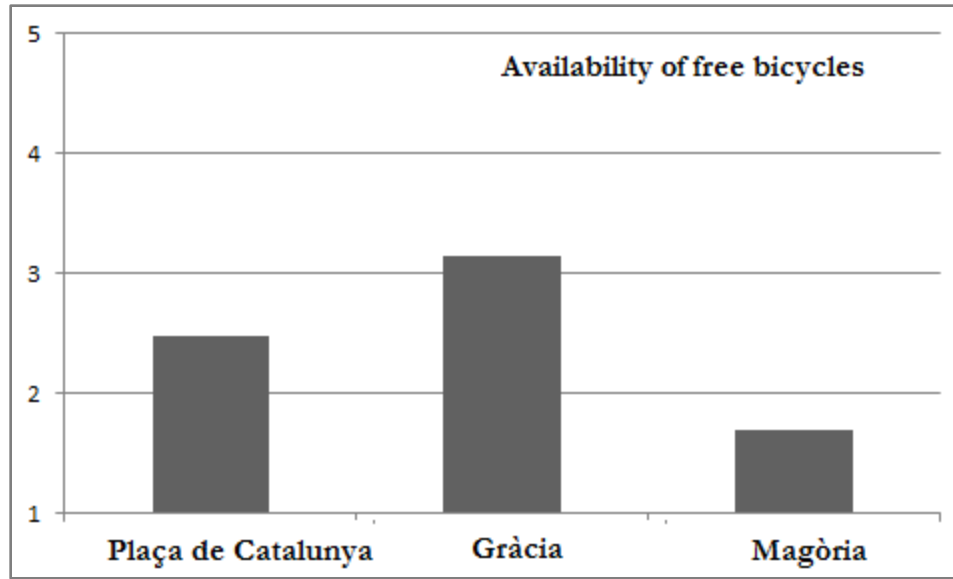


Figure 40. Average grade of the availability of bikes

At Plaça de Catalunya the reason for being unable to take a free bike or park a bike is the fact that there is a high number of users during the day, while at Gràcia users happily take bicycles downhill into town but take other modes of transportation to go back uphill, leaving the bicycles behind, which is related to the location's topography (Midgley, 2011). At Magòria there are enough free bikes for users, since the area is not popular among Bicing users, so the frequency of usage is low. Unavailability of parking the bikes is an enormous problem for all areas since it got grades 3.7, 3.85 and 2.51, making it the biggest obstacle at Gràcia and Plaça de Catalunya (Figure 38).

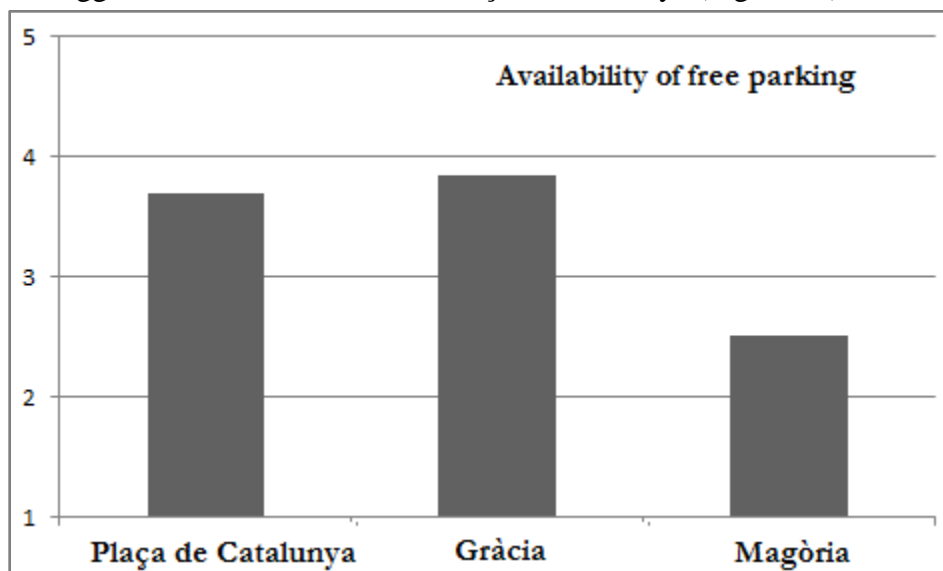


Figure 41. Average grade of the availability of free parking

CONCLUSION and recommendations

CONCLUSIONS

This research had the main objective to identify spatial, urban and physical aspects that can explain the functioning of Bicing. According to that, using relevant literature, many factors were defined and identified, but only the most important and most relevant ones were selected for further research. Related to spatial aspect, following factors were selected: presence or absence of bike infrastructure, location and number of Bicing stations; and proximity of Bicing stations to public transport stations. Social factors in the research are: activities and functions present at locations, amount of people present and passing by through area; and perception of safety of cyclists.

Since the study areas were three different locations within the city of Barcelona, hence the aspects and their influence on Bicing users vary. According to their effect, at Plaça de Catalunya the biggest influence on Bicing users have unavailability of free bicycles and parking slots, but also the amount of people that is present and passing by through this central business area. At Gràcia the most influential aspects are unavailability of free bikes and parking slots, but at the same time it was proven that the location of Bicing stations are inappropriate according to the respondents in the survey. Like at Gràcia, also at Magòria the location of Bicing stations are also inadequate, especially in a relation with public transport. In addition, respondents in the survey expressed their dissatisfaction with activities and functions that are present or missing at this area. According to previously stated, unavailability of free parking slots and free bicycles have to be centre of future system analysis and eventual improvement, since the availability of parking and bikes make the spine of functionality of all bike-sharing system (Raviv and Kolka, 2013).

The characteristics of spatial aspects vary according to a location of the certain city part. This means that the Bicing users' needs need to be tailored according to the specific locations, since they cannot be applied in the same way throughout the city. In a relation to that, Plaça de Catalunya was characterised as an area with appropriate locations of Bicing stations and their proximity to public transport stations, but at the same time, Plaça de Catalunya is lacking biking infrastructure, which is important obstacle for Bicing users according to infrastructure's encouraging effect on bikers (Faghih-Imani, Eluru, El-Geneidy, Rabbat, and Haq, 2014). At Gràcia and Magòria, spatial factors have different dimension, i.e. location of Bicing stations and their number are inadequate, but even though there are missing bike lanes, it does not have huge negative effect on the users of this bike-sharing system at these locations. However, special focus on Bicing

functioning at Gràcia and Magòria need to be put on stations locations, as one of the crucial element of successful functioning of any bike-sharing system (Martens, 2007).

DIRECTIONS AND SUGGESTIONS FOR IMPROVEMENT OF BICING'S PERFORMANCE BY ELEMENTS PRESENTED IN FIELDWORK SURVEY ON SPECIFIC LOCATIONS

- **BICYCLE INFRASTRUCTURE** – Biking infrastructure is one of the crucial elements of any bike-sharing system. Bike lanes not only make physical space for bicycle usage but they also physically separate bikers from the rest of the traffic participants. That is closely related to **SAFETY** of cyclists, but at the same time, it has an enormous effect on perception of safety of all current and potential bikers in the future. The demand for additional bike lanes is especially visible at Plaça de Catalunya (according to the survey) where interviewed Bicing users expressed their dissatisfaction by current network of bike lanes. Some of the locations that should be first in a line for a future bike lane construction are central business areas (Plaça de Catalunya, Plaça de Espanya and Plaça de Universitat), but also areas around important touristic attractions, in order to separate cyclists and increasing number of tourists in Barcelona. Another possible solution for improving the quality of bike infrastructure is to transform existing vehicle roads. This transformation can include closing certain roads for vehicles, so that those roads can be used for biking. Mentioned improvement can be conducted full time, or the roads can be closed for vehicles at certain part of day or week (e.g. in the afternoon or on weekends).
- **LOCATION OF BICING STATIONS** – One of the essential aspects of functioning of Bicing is the location of its stations. They should be only placed near the important buildings and objects, but also to make it as an extension of public transport since the use of public bicycles increases potentially when they are complemented with other transportation modes (Frade and Ribeiro, 2014). For bicycle-sharing to be an attractive option in any city, the following urban mobility element is essential: an effective public transport system which can be integrated physically and operationally with bike-sharing (Midgley, 2011). According to that, new stations and the existing ones should be situated to form a bridge between public and transport in general, and points of interest of all Bicing users, like schools, universities and shopping centres. This requires an evaluation of every neighbourhood

separately, and its characteristics in order to obtain adequate location of each bike-sharing system station. Hence, it cannot be done on a city level.

- **AVAILABILITY OF FREE BIKES AND PARKING** – This element is considered, and proven in this survey, as the most problematic for Bicing users since these aspects were marked as unsatisfying at all three locations, making it in top three biggest obstacles for users of this bike-sharing system. To encourage people to return bikes to underused stations, Paris recently announced a 15-minute credit for returning bicycles to specific stations, particularly those on hills (Antoniades and Chrysantho, 2009). By this, not only the issue of free bikes and parking can be improved, but also an element related to price and situation at the stations uphill and downhill (Gràcia). Also, without over sizing the system, there are basically two ways to solve these problems: inform the user in advance about the best places to pick up or leave the bikes and improve the redistribution of bikes from full to empty stations. (Kaltenbrunner, Meza, Grivolla, Codina, and Banchs, 2010). Besides mentioned, an analysis can be done of the whole system in order to define the most problematic stations (related to parking and bike availability) and intensify the redistribution of bicycles by trucks in certain locations. Increasing the number or capacity of stations at the most popular locations can be one of the steps of resolving this important issue.
- **ACTIVITIES PRESENT AT THE AREAS** – In survey conducted at the location of Magòria users expressed their dissatisfaction with activities present at this area. In other words, respondents stated that Magòria region does not have enough activities or functions that would attract people to come here (in this case using Bicing) and that people who live here need to go other parts of the city to fulfil their daily needs. On the other hand, Bicing users at Plaça de Catalunya showed their frustration by enormous amount of people they face on daily basis. The both issues can be solved by long term planning and reconstruction of these city parts. According to this Magòria region can be enriched by additional activities like shopping centres, education institutions or some other points of interest that local population need. By doing this not only that Magòria will be more interesting and attractive for Bicing users, but also it would lead to relieving of people present at Plaça de Catalunya to Magòria.

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ENQUESTA SOBRE L'ÚS DEL BICING

L'objectiu d'aquesta enquesta és identificar quins dels factors presentats tenen més influència (positiva o negativa) en els usuaris actuals del Bicing, a l'àrea de la Plaça de Catalunya.

PREGUNTA 1

1. QUINS ELEMENTS ET LIMITEN DE FER SERVIR EL BICING MÉS SOVINT EN AQUESTA ZONA?

	DECAT (MOLT BONA)	2	3	4	MOLT PESSIMA (0)
1.1. Presència dels carrils bici	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
1.2. La ubicació de les estacions a la zona	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1.3. El nombre d'estacions a la zona	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1.4. La distància de les estacions fins al transport públic més proper	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1.5. El preu del servei del Bicing	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
1.6. Els continguts i activitats presents en aquesta zona	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1.7. La quantitat de la gent presenta i la gent passant per l'àrea	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
1.8. La seguretat per als ciclistes	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
1.9. Disponibilitat de les bicicletes lliures	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
1.10. La disponibilitat de places d'aparcament a les estacions	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
1.11. L'estat físic de les bicicletes del Bicing	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

PREGUNTA 2

2. QUINS FACTORS L'ANIMARIEN A FER SERVIR MÉS SOVINT EL BICING EN AQUESTA ZONA?

MÉS XARCA/CAIENT

PREGUNTA 3

3. CARACTERÍSTIQUES DE L'USUARI I EL VIATGE

3.1. Edat

☐ <18 ☒ 18-25 ☐ 26-35 ☐ 36-45 ☐ >45

3.2. El propòsit del viatge

☐ SERVEI DE ☒ PRIMA ☐ TURISMA ☐ CONVOCAIÓ ARA ALTRES ACTIVITATS DE TRANSPORT ☐ RECREU ☐ ALTRE

3.3. Freqüència en l'ús del Bicing (per setmana)

☐ 0-1 cops ☒ 2-4 cops ☐ 5-7 cops ☐ 7+ cops

3.4. Durada del viatge (minuts)

15

3.5. Sexe

☐ HOME ☒ DONA

Characteristic Architectural Style Of Bosnian Mosques Influenced By Structural System And Applied Materials

Mustafa Hasanović

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Abstract | This research paper examines the era of mosque buildings in Bosnia and Herzegovina following the beginnings from Ottoman period, through Austro - Hungarian till today. In these periods, the mosque had a major role in life of the Bosnian Muslims and also other people that together occupant there lands with unique architectural style.

Therefore the research question is: Does Bosnia and Herzegovina possess unique architectural mosque style that is influenced by structural system and domestic materials?? The answer to this question is that the country possesses unique architectural mosque style which is easily recognizable and identified in several mosques design which will be in detail explained. What are the common features and differences of mosques? Which places are common for building different mosques? Which structural systems are used? Which native materials are used for construction? And many other questions will be analyzed to determine best answer.

Key words : Mosque, Bosnian architecture, Ottoman period, Pitched roof Mosque, Domed Mosque, Modern Mosque style...

1. Introduction

Since the arrival of Islam in the Western Balkans in the late fourteenth century, Bosnia's mosque architecture has evolved in a complex and multiethnic cultural topography and under the successive regimes that ruled Bosnia for 500 years. All of these regimes gave something different to Bosnia. Of course, mosque architecture had influence from different periods that were happened in this territory. Bosnia is a very rich country in different natural materials like wood, stone; clay etc. and those materials were usually used for mosque construction.

During these periods the most recognizable types of mosques where: pitched roof mosque, domed mosque and modern mosques style. The first type, pitched roof mosque with wooden minaret built in the smaller settlements, villages. Materials that were used in those mosques where stone and wood. Wood was used inside of mosques but also outside part.

The second one, domed mosque, with regular minaret built from stone or other material in bigger settlements, important parts of city and country. Structure of these objects were little bit more complex because of their dimensions, height etc.

The third, modern mosque style, are the last type of mosques. They are designed in recent years, combination of modern movement and Bosnian design tradition. One of the examples is Behram begova Mosque in Tuzla which architect is Zlatko Ugljen. The structure of these mosque are very complex, using different materials like concrete, steel, laminated wood, glass etc.

2. Islam and mosques in Bosnia and Herzegovina

Islam like monotheistic religion was spreading with high speed conquering large territorial possessions. These territories were given the opportunity to develop and to use inventions from Islamic world in large scope of fields, from construction, medicine, agriculture, etc. The Islam like religion was entering into all pores of life. Private, public life, laws, orders, are precisely defined and explained in details. These laws and regulations are reflected in the fact that the state was regulated and highly developed.

2.1. Islam in Bosnia and Herzegovina

It is commonly thought that Islam and Muslims first appeared in the Balkans and South Slavic countries with the conquest of the Ottoman Turks and that means the mid-fourteenth century. This view would be more correct if one takes into consideration the age and origins of today's members of Islam. Namely, the beginnings of today's Islamic population in the Balkans and the South Slavic countries date back to the late fourteenth century. Since then, we meet with the ancestors of today's Turks, Muslim Albanians and Muslim Bosniaks.

Even before that, Islamic missionaries of faith were coming to this area to spread the religion of Islam and thus connect with Europe and the Balkan countries. A. Smajlović in his book *Islam and Muslims in Bosnia and Herzegovina*¹⁴⁵ speak about how Islam came to this area. In the first place there were wars that Arabs had with Byzantines, where in the side of Arabs were Slavs. It is mentioned in one source that the Caliph's personal guards were Slavs who converted to Islam. Second way is commercial travelers

¹ A. Smajlović - *Islam and Muslims in Bosnia and Herzegovina (Islam i muslimani u Bosni i Hercegovini)*- 1977 – Sarajevo.

and trade that developed between the two areas. Evidence of this way is Arab money that is found in some part of Bosnia and Herzegovina and that money still remain in private collections and museums. And the final way, were Islamic missionaries who spread religion thought this region. Evidence for that are Islamic books that were given people to help conversion to Islam. In this manner, it is very important to emphasize that the Cyril and Methodius¹⁴⁶ who were Slavic apostles had good knowledge of Islam. In this way they were able to enter into a defense of Christianity which they are expanding.

Before the conquest of Bosnia and Herzegovina by the Sultan Fatih 1463, outrageous violence against his people compel those who belonged to the church Bosnian to receive Christian faith, and those who did not want to do so fled to the land of Herceg Stjepan. This was one of the reasons why the populations of Bosnia and Herzegovina have converted to Islam religion.

Likewise, there were some Catholics conversions to Islam. Apostolic Visitor Petar Mesarechi¹⁴⁷ explains how in Bosnia came to an absolute majority of Muslim population and underline mass skip Catholics to Islam in Sutjeska and Trebinje area.

There are also historical evidences of mass crossings Orthodox Christians to Islam. Track of such crossings left a monk Marko Trebinjac¹⁴⁸, which recorded that many without force, which is important to point out, leaving Orthodoxy and embraced Islam.

In the western Balkans, Bosnia and Herzegovina and some parts of Croatian was not done colonization of the Muslim population of Turkish ethnic origins than the local population Islam religion and become Muslims. In this way, the Muslim population was of endogenous origin. The Turkish language was spoken in all other part of Balkan but not here, because there were just local people who accepted Islam. The phenomenon that is massively converted to Islam in Bosnia was the main factor that there has been no Turks colonization, especially said one of most famous Turkish historians Omer Lutfi Barkan.¹⁴⁹

2.2. Mosques in Bosnia and Herzegovina

² Cyril and Methodius - They were the principal Christian missionaries among the Slavic peoples of the Pannonia, introducing Orthodox Christianity and writing to the hitherto illiterate, pagan Slav migrants into the Balkans. Through their work they influenced the cultural development of all Slavs, for which they received the title "Apostles to the Slavs".

¹⁴⁷ A. Smajlović - Islam and Muslims in Bosnia and Herzegovina (Islam i muslimani u Bosni i Hercegovini)- 1977 – Sarajevo.

¹⁴⁸ A. Smajlović - Islam and Muslims in Bosnia and Herzegovina (Islam i muslimani u Bosni i Hercegovini)- 1977 – Sarajevo.

¹⁴⁹ A. Smajlović - Islam and Muslims in Bosnia and Herzegovina (Islam i muslimani u Bosni i Hercegovini)- 1977 – Sarajevo.

The appeal of oriental Islamic civilization came from its circumstances as it brought one hanging living standards (housing, equipment housing, costumes, dishes) - architecture within reach of human hands. Oriental Islamic influences were so intensive and they can be seen in some parts of church architecture, church furnishings and objects, as well as decorating the churches and in the religious life of Christians. These questions further studied Andrej Andrejević¹⁵⁰ in relation to the architecture of the church buildings. Andrejević came to conclusion that almost all the preserved buildings of the monastery bear the fragments that have some characteristics of Turkish architecture.

Bosnian architecture found a strong expression of one very important characteristic of Islamic civilization, and it is emphasized a positive attitude towards nature and life. Thus, Bosnian architecture tends to fit harmoniously into the green landscape, which residential and other buildings were exposed to the sun and to water (rivers) potential.

Decorative oriental Islamic art are represented in the Bosnian civil engineering (construction), artificial crafts products from copper, gold, silver, metal, etc. and also, these elements are contained in rugs, sedžada, vez, etc.

Oriental Islamic Architecture in Bosnia had use wood like a construction material, which gives great design possibilities and flexibility. This is a consequence of forest wealth of Bosnia but also a continuous tradition of the old Slavic art from wood.

It is important to say that some people are competing in doing good deeds, for the general benefit of the people and state. Organizational form of these good deeds is pious endowments (waqf)¹⁵¹ where is actually, in material respects, rested Islamic civilization. The endowers were not only members on the Ottoman elite and high state officials, but also local merchants, imams, craftsmen, and others including female not just male population. For instance, the first endowments of Gazi Isa beg Isakovic, built in 1457, allowed for the developments of the city of Sarajevo and its market “Baščaršija”. Later on, Gazi husrev-beg, governor of Bosnia from 1521 until 1541, endow largest of all waqf in the region.

The institution of the waqf provided the basis for the development of cities public infrastructure. The architectural historian Husref Redžić¹⁵² contends that the mosque

¹⁵⁰ Andrej Andrejević, *Islamska monumantalna umetnost XVI veka u Jugoslaviji, kupolne džamije*, (Islamic Monumental Art in XVI century in Yugoslavia), Institut za istoriju i umetnost, Srpska Akademija nauka i umetnosti, Balkanološki institut, Beograd, 1984;

¹⁵¹ Waqf- mortmain property, is, under the context of 'sadaqah', an inalienable religious endowment in Islamic law, typically donating a building or plot of land or even cash for Muslim religious or charitable purposes. The donated assets are held by a charitable trust. The grant is known as mushrut-ul-khidmat, while a person making such dedication is known as wakif.

¹⁵² Husref Redžić, *Studije o islamskoj arhitektonskoj baštini* - Biblioteka Kulturno nasljeđe, Sarajevo: Veselin Masleša, 1983

itself represented and infrastructure node within two main zones of Ottoman cities: the commercial zone with main market square (čaršija) and the residential areas (mahale) located around market. At square, the mosque was frequently placed in the center or at the intersection of major streets. Because of high frequency of visitors, the mosque provided and impulse for the growth of urban commercial areas around it.

Muslim residential quarters usually had thirty to forty houses and own mosque after which is usually named. (Picture 2.2.1.) Mahala mosque also served as community center, providing neighboring residents with access to education (mekteb) a public fountain (šadrvan), food for poor (imaret) and fresh produce. In short public life in mahala centered on mosque.

As the nucleus of the čaršija and mahala, the mosque represented the defining unit of the Bosnian city in Ottoman period, corresponding to important role that churches played in cities elsewhere in Europe at that time. Beside its significance as and infrastructural node and community center, mosque also affected legal status, size and economic importance of city and mahala.



Fig.2.2.1. - Vaiz Mehmed Ali-efendijina (Mejdanska) mosque ¹⁵³

¹⁵³ Picture of Vaiz Mehmed Ali-efendijina (Mejdanska) mosque. It was built by Jalal Vaiz Mehmed Ali ef. 1644. One of the oldest surviving mosques with a wooden minaret in the territory of South East Bosnia. It is preserved over 360 years and is a true rarity in these parts. It represents the religious, cultural, educational and social center of the mahala.

Picture was taken from web page:

[http://bs.wikipedia.org/wiki/Vaiz_Mehmed_Ali-efendijina_\(Mejdanska\)_dzamija](http://bs.wikipedia.org/wiki/Vaiz_Mehmed_Ali-efendijina_(Mejdanska)_dzamija), on April 1, 2015

Mosque architecture, far from being simply religious necessity, fueled a multipurpose strategy in Bosnia, it signaled the presence of Islam and declared the competence and grandeur of the Ottoman Empire, but in its more vernacular forms it provided social services and nucleated urbanism in a largely agrarian population.

First mosques appear in the landscape with the arrival of Ottomans. They were built by and for the Ottoman army in conquered areas of east and central Bosnia, as interpolations of the garrisoned medieval fortified towns and fortresses. Architectural historian Madžida Bećirbegović¹⁵⁴ contends that many early mosques were modest, single space structures with wooden minarets. Their construction was an integral part of structural adaptation of fortresses, which were made in order to satisfy the spiritual needs of Ottoman garrisons. These fort mosques were usually built either as separate buildings or preexisting structures were transformed into mosques with the addition of minaret.

Example of this early mosque architecture in citadels stood in Teočak, a medieval fortress located in south-east part of Bosnia build between fourteen and fifteen century. This mosque (Fethija mosque)¹⁵⁵ (Fig.2.2.2.) is redesign and converted from pre-existing church (Franciscan monastery). The programmatic transformation of this church into mosque was architecturally resolved with a few interventions, such as the construction of a mihrab in the interior and adding wooden minaret.

As the empire expanded, the ottomans usually turned the mayor churches of cities that they conquered into mosques, but they left other smaller churches to the local Christians for their use.

¹⁵⁴ Madžida Bećirbegović, *Džamije sa drvenom munarom u Bosni i Hercegovini* (Mosques with wooden minarets in Bosnia and Herezegovina) ,Sarajevo:Veselin Masleša, 1990

¹⁵⁵ Fethija mosque - The mosque is located at the foot of the old fortress on a hill between the slopes Gullies, Medic, Tursanovog brda and Grahoviste in Teočak municipality, whose construction is mentioned name of Sultan Fatih Mehmed II, after the capture of the fortress in 1474th. Mosque is registered at the National Institute of Sarajevo as a cultural monument. Under the protection of the state since 1959.



Fig.2.2.2. - Fethija mosque ¹⁵⁶

The process of urbanization – that is, the development of interlinked townships and cities, with mosques, tekkes, madrasas, mektebs, mousolea, bridges, and other religious and civic buildings, represented a vital factor in establishment of Ottoman power in the region. The foundation of cities in the early Ottoman period was a result of a state policy planned according to different geopolitical and military needs. The development of almost all settlements and cities in the Ottoman period stated with foundation of a major mosque, frequently named after ruling sultan.

Construction of mosques in Bosnia was also institutionally supervised and regionally organized through the regional governments. Some architects received land grants for their services. Craftsmen were organized into *esnafs* (guilds), an institution that had a great impact on the development of cities and religious architecture. In regard to mosque, particularly important were crafts that involved work with stone, metal, wood or textiles.

Because of its geopolitical locations at the border between Islamic and Christian empires, Bosnia was continuously exposed to different cultural influences, which also informed its local building traditions. Influence in mosque design in the region came not only from the east, but also from neighboring regions to the south and the west.

Regional similarities in local mosques architecture also emerged based on climatic conditions and available materials. This explains why the majority of mosques in Herzegovina, a region characterized by Mediterranean climate, limestone landscape, and sparse vegetation, are built entirely in limestone, including even roof tiling. (Fig.2.2.3.) On the other hand, vernacular mosques in Bosnia, a region rich with forests and with continental and partly alpine climate, are built mainly as combination of wood and stone

¹⁵⁶ Picture of Fethija mosque, taken from web page:
http://photos.wikimapia.org/p/00/02/29/15/57_big.jpg, on April 1, 2015

structures, or sometimes entirely in wood. The architecture of mosques has also been changing through time, as a consequence of repeated damages and repairs and rebuilding.



Fig.2.2.3. – Mosque in Lizopercima ¹⁵⁷

3. Types of mosques, applied materials and structural forms

3.1. Pitched roof mosque style

Mosques with wooden minarets in Bosnia and Herzegovina belong to the most common type of single-space mosques by their basic concept. Only a few mosques have different solution types like mosque with columns.¹⁵⁸

The spatial form of the standard single-space mosque with a wooden minaret includes a portico with sofas and main space for prayer, which are connected with hipped roof from which the wooden minaret is rising. Porch is usually located on the North West side, i.e. opposite the mihrab. In the majority of mosques, prayer space, or the main area of the mosque, if not a square, has a shape which is slightly elongated rectangle, as this form can be best tailored to the size of the mosque and has basic requirements of a structural nature.

¹⁵⁷ Picture of Mosque in Lizopercima - The mosque is located in Lizoperci village located in the area of Donja Rama at a distance of 20 km from the settlement of Jablanica. According to the inhabitants of the village, a mosque was built in 1530 by Pozder effendi or Pozder- Bey, who also initiated settlement Lizoperci. Picture taken from web page: <http://www.epoha.ba/?p=11389>, on April 1, 2015

¹⁵⁸ Madžida Bećirbegović, *Džamije sa drvenom munarom u Bosni i Hercegovini* (Mosques with Wooden minarets in Bosnia and Herezegovina) Sarajevo: Veselin Masleša, 1990;

Mosque with a wooden minaret is striving to achieve maximum space effect with a minimum of material resources and to have maximum spaces for prayers. These effects are achieved with different positions of mahfila. (upper floor of mosque).

Bosnia is a country with rich and different kinds of construction wood. That wood was used for construction different buildings and other facilities during history. In higher parts of Bosnia there is a lot of pine and fir woods from which are made long logs and in lower parts of Bosnia oak woods from which are made shorter piles and columns. Therefore, many mosques were built by this type of the materials.

3.1.1. Wooden mosque in Bužim

After Cazin, Bužim was the second largest city in Krajina. Exterior part of old city was made in XIV century and interior part 1484. The city is finally occupied by Ottomans in 1576. The old wooden mosque in Bužim is in front of the mediaeval fortified town of Bužim, some 125 m to the south-west of the fort. It is not known when the original mosque was built. The oldest surviving “nišan” in the mosque harem dates from 1856. A levha dating from 1838 in the mosque notes that in 1838 Vedžihi paša restored the mosque and the Hudut česmu. This is corroborated by a vakufnama dating from 1840, also in the mosque.¹⁵⁹

The beauty of this religious facility attracts passers and many of them come to see it and take pictures. Of course, the mosque even today serves its purpose (praying place). In particular, it should be noted that her beauty is emphasized during the holy month of Ramadan. The wooden mosque building, of rectangular ground plan, has exterior dimensions 14 x 18 m + 2.5 x 18 (portico), and a total usable area of 414 sq.m. (225 sq.m. ground floor + 162 sq.m. mahfil), is the largest wooden mosque in Bosnia and Herzegovina.¹⁶⁰ Interior height of 5 m influenced on horizontal and vertical articulation. Like the wooden mosques in Priluk and Poljice, this mosque is a sizeable wooden

¹⁵⁹ Mehmed Mujezinović, *Islamska Epigrafika u Bosni i Hercegovini*, Knjiga III – Bosanska Krajina, zapadna Bosna i Hercegovina, Biblioteka Kulturno nasljeđe (Sarajevo: Veselin Masleša, 1982);

¹⁶⁰ Commission to Preserve National Monuments, Bosnia and Herzegovina, Old Wooden Mosque in Bužim, (http://kons.gov.ba/main.php?id_struct=50&lang=4&action=view&id=1829_date, March 29, 2015)

structure with facades articulated horizontally and vertically.¹⁶¹

Uniqueness of this mosque are the arrangement of load bearing wooden pillars with corbels bearing wooden joints lying parallel with the mihrab wall. Access to the mosque is from the north-west, through a covered single-storey entrance portico with a pent roof.

The mihrab is undecorated, as is the wooden “ćurs” to the left of the mihrab. The mimber is wooden, decorated with molded arches, and the stair railing is made in the same way as the railing of the interior sofas. The mosque has two rows of rectangular windows. The upper and lower windows are not set in line with each other vertically. All the windows are double sash, single-glazed with ordinary glass, without exterior “mušebak” (lattice) or interior shutters.

The mosque has a hipped roof and roof structure is entirely made of oak, clad with double curved tiles. The original cladding of shingles was replaced by tiles more than 30 years ago. The minaret, which has a total height of about 17 m, is reached from the central loft area. Minaret was also made from oak wood. Around the mosque there is a burial ground, with about 20 “nišans” and fountain (“česma”).

Older residents of Bužim claim that during its construction was not used a single nail, or any piece of metal. The mosque is totally made from wood. It is interesting to point out that the mosque survived all the wars that took place in our region.

¹⁶¹ Madžida Bećirbegović, *Džamije sa drvenom munarom u Bosni i Hercegovini* (Mosques with Wooden Minarets in Bosnia and Herezegovina) Sarajevo: Veselin Masleša, 1990;



Fig.3.1.1. The mosque with surroundings and in backgrounds the old city of Bužim. ¹⁶²This picture is taken before renovation, with different roofing and minaret. These changes were done 1938.



Fig.3.1.2. A new renovated mosque that is visible today. The renovation was done by Commission to Preserve National Monuments of Bosnia and Herzegovina, because this mosque and complex around mosque is National Monument of Bosnia and Herzegovina. Like it is visible in these two pictures there is a total difference with roofing and minaret.

These two elements were replaced to achieve a appearance that this mosque had before. ¹⁶³**3.2. *Domed mosque style***

¹⁶² Picture of Wooden mosque in Bužim. Picture was taken from web page: <http://reprezent.ba/index.php/vijesti/buzim/6490.html>, on 10th March, 2015

¹⁶³ Commision for Preservation of National monuments, Bosnia and Herzegovina, Old Wooden Mosque in Bužim, (http://kons.gov.ba/main.php?id_struct=50&lang=4&action=view&id=1829, date March 29,

The stylistic development of domed mosque architecture in Bosnia paralleled architectural tastes and trends in the center of the Ottoman Empire, though on a smaller scale. Thereby, as architectural historian Alija Bejtić¹⁶⁴ states, the Ottoman architectural idioms were not just transplanted from Istanbul to Bosnia, but were assimilated and adapted to local cultural and economic contexts.

Most of these types of mosque at ground plan scheme have a clean square shape (central buildings). Only a few of them, and that later, have a slightly elongated, Gazi Husrev beg's in Sarajevo (built in 1530) and Ferhat Paša's in Banja Luka (1579).

Mosque with a stone dome over a square space stands out because of building materials. In these mosques four massive stone wall crossing filled with stalactites trompe the tambour, over which lies dome or dome-shaped section calotte. Such mosques have adorned stone porch with a system of columns and these decorations further enhance architectural décor and flat ornamentation. Both of these have a strong expression in this type of mosque. Architectural décor is reflected in the diverse forms of arches, capitals, bases and other elements.

Ornaments in the blade configuration emphasize the strong colors and stylized oriental ornament arabesques with vegetable and geometric variations. "Aladža" mosque in Foča and the Gazi Husrev Beg's mosques in Sarajevo are examples where this enhanced standard flat ornamentation reached masterful expression. All such mosques seem to be so pleasant and intimate. Interior of high dome mosques seems larger and majestic, than really is.

The most famous mosques with their architecture and decorations are: Gazi Husrev beg's mosque (built in 1530), Emperor's mosque (built in 1565) and Ali Pasha's mosque (built in 1561) in Sarajevo, Aladža-mosque in Foča (built in 1550), Karadžobeg's mosque in Mostar (built in 1570), Sinanbey's mosque in Čajniče (built in 1582), Ferhad Pasha's mosque in Banja Luka (built in 1579), Kalaun Yusuf Pasha's mosque in Maglaj (built in 1584) and Kizlaraga's mosque in Mrkonjić grad (built in 1591).

2015) Picture of Wooden Mosque in Bužim. Picture was taken from web page:
<http://reprezent.ba/index.php/vijesti/buzim/6490.html>, on 10th March, 2015

¹⁶⁴ Alija Bejtić - Spomenici Osmanske arhitekture u Bosni i Hercegovini (Monuments of Ottoman architecture in Bosnia and Herzegovina)

Another important factor of mosque design in the Ottoman period was the personal taste and financial potency of patrons. Although less wealthy patrons also strived for monumentality, they were mostly not able to afford the cost of building a domed mosque. As a compromise, some mosque builders translated the grandeur of a domed mosque into interior design of their pitched roof mosques through construction of barrel shaped ceilings, false interior domes made of wood.

Patrons and mosque builders in Bosnia might have been inspired by the mosque trends developed elsewhere in the Ottoman Empire, to which they were exposed during their travels to Istanbul and other large cities in the empire, as well as during pilgrimage to Mecca. First of them were Turkish builders who bring these architectural models to Bosnia. They were the primary mosque designers in the region. Architectural paradigms from Istanbul were principally distributed to the periphery via guild system which operated in a highly centralized manner at the time.

3.2.1. Ferhat Pasha Mosque in Banja Luka

Ferhadija Mosque was the central building in Banja Luka “čaršija” and one of the most successful achievements of Islamic architecture of the XVI century on our land. It was built in 1597, which can be testified with tarih above the entrance, at a time when Ferhad Pasha was still Bosnian “sandžakbeg”.¹⁶⁵

The mosque with its classical Ottoman architecture was most probably designed by a pupil of Mimar Sinan. This complex is consisted of: mosque itself, the courtyard, a graveyard, the fountain, 3 mausoleums ("turbes") and the surrounding wall with the gate.

Ferhadija mosque is different in its spatial treatment of common types of mosque, built in our country in the period from the sixteenth to the eighteenth century, so-called. Istanbul style. These mosques have a single solution, single dome covers the entire prayer space and three small domes cover open porch. Ferhadija mosque has a complex ground plan, which is resulted in a multi dome system.

Ferhad Pasha's Mosque measured 14.47 by 18.33 meters and had massive stone walls and up to 120 cm. It is built by crystal tufa (sedra), whose blocks were different sizes and shapes, put together with lime mortar and clamps using liquid lead. The minaret had also different sizes of stones thickness, from 50 cm till 30 cm depending on the height. The

¹⁶⁵ Official web page of mosque: <http://www.ferhadija.ba/> Date: March 29, 2015

position of minaret was on the right side of praying part and the total height was 41.7 meters.¹⁶⁶ Prof. Amir Čaušević, in his PhD. dissertation had investigated architectural and constructional characteristics of minaret in this mosque.

Ferhadija was subsequently protected by UNESCO until its destruction in 1993. Today the site, with the mosque's remains, is listed as a national monument of Bosnia and Herzegovina with decision from Commission for Preservation of National Monuments of Bosnia and Herzegovina in 2003.¹⁶⁷



Fig.3.2.1. The mosque with Sahat kula in the right part. This was before destruction that occurs during the last war in 1993.¹⁶⁸

¹⁶⁶ Amir Čaušević, PhD dissertation – Arhitektonsko - konstruktivne koncepcije tornjeva sakralnih objekata – ponašanje na atipične pobude,(Architectural - Structural concepts of Religious Buildings Towers - Behavior on Atypical Initiatives) Sarajevo;

¹⁶⁷ Commission for Preservation of National Monuments, Bosnia and Herzegovina, Ferhad Pasha mosque (Ferhadija) in Banja Luka, Decision of 7 May 2003, no: 08.2-6-533/03-8

¹⁶⁸ Picture of Ferhat Pasha Mosque in Banja Luka. Picture was taken from web page: http://kons.gov.ba/main.php?id_struct=6&lang=1&action=view&id=1326, on 10th March, 2015



Fig.3.2.2. The mosque after destruction. Ruins, stones, materials were transported to local deploy in Banja Luka.¹⁶⁹



Fig.3.2.3. Today's condition of mosque. All works that consists of conservation, reconstruction and consolidation of parts are in final stage. The last Ramadan, mosque was used for her basic purpose, praying.¹⁷⁰

¹⁶⁹ Picture of Ferhat Pasha Mosque in Banja Luka. Picture was taken from web page: <http://www.ferhadija.ba/index.php/bs/>, on 10th March, 2015

¹⁷⁰ Picture of Ferhat Pasha Mosque in Banja Luka. Picture was taken from web page: <http://www.ferhadija.ba/index.php/bs/>, on 10th March, 2015

3.3. Modern mosques style

In last decades the numerous mosques building are built. Some of them are just reconstructing form destruction that occurs during last war. The other ones, new mosques, are being built from beginning. The design and construction of these new mosques is different. New technologies, materials, techniques are used to represent new modern age.

Architects, who tend to be creative in the design of mosques in modern age, have paid a special attention to the design of minarets. Various forms are tried for this reason.

While some of them choose to re-interpret the traditional forms, others started from scratch. At some point, this effort of interpretation came to such a point that, the designer even decided not building a minaret; but using a symbolic element instead, such as the tree or some other element that can metaphorically represent minaret. Because of new technologies and materials, the design of modern mosques doesn't have limitations. It is possible to have different shapes of roofs, minarets, prayer spaces, entrances etc.

Bosnia and Herzegovina have several examples of these types of mosques which are representing important architectonic elements of modern architecture. Some of them are: Mosque of Behram beg's medresa (Zlatko Ugljen), Šerefudinova Bijela mosque in Visoko (Zlatko Ugljen), Džedid mosque in Brčko (Husejn Dropić), Gazi Turali-beg's mosque (Zlatko Ugljen and Husejn Dropić)

3.3.1 Šerefudin's White Mosque

Šerefudin's White Mosque (Bosnian: Šerefudinova Bijela džamija) is a mosque located in Visoko, Bosnia and Herzegovina. It is of great architectural importance to the town and area.

In the sixties, it was decided that the place of the dilapidated, more than 500 years old, Šerefudinove mosque build a new facility. The idea was to keep fully function, but is to enrich the contemporary amenities and modern visual identity. The project itself was finalized in 1969, and the construction works on the building lasted until 1980. The opening ceremony of the mosque took place on 7 September 1980. The building was then given a new name, created as a result of the dominant snow-white exterior and interior of the building - the White Mosque.

At a time when the design and construction of mosques in Bosnia and Herzegovina represented just naively repeating elements of Ottoman religious buildings style, the White Mosque adopted a new approach, which very successfully implemented 'traditional' function through contemporary architectural expression .

Its most notable award came in 1983, when it was awarded the Aga Khan Award for Architecture. The jury commended the mosque for its boldness, creativity and brilliance, as well as its originality and innovation.

Unfortunately, the White Mosque had not attention that they deserve. In the period after the opening of the facility, until today, numerous inappropriate interventions had been made, both at the facility, as well as his inner environment.

On the other hand, there are also inadequate connotations related to the external appearance of the building. As a result of this treatment, this pearl of Visoko čaršija, today have a situation in which the White Mosque is no longer white (the dominant white roof shells are lined with sheet metal roof), its annex is empty and neglected, mosque courtyard with fountain is completely disappeared, and the vistas and outdoor adventure White Mosque are disabled.



Fig.3.3.1. Former and today's condition of mosque like it is described in text previously. ¹⁷¹

¹⁷¹ Picture of Šerefudin's White mosque in Visoko. Picture was taken from web page: <http://www.iic-hrvatskagrupa.hr/bosna.html>, on 20th April, 2015



*Fig.3.3.2.The interior of White mosque.*¹⁷²

The main materials for the building construction were concrete for the walls and the dome, white mortar for interior walls, travertine (stone) for the outer lane and courtyard pavement. Minaret was made from concrete and some steel elements.

4. Common parts of mosques

4.1. Mihrab

Mihrab is important part of mosque or mesdžid even when mosque don't have minaret. Mihrab is semicircular niche on the southeastern wall and indicates the direction of rotation of the faithful during prayer. That is the place for imam (Muslim priest) who leads prayer. Mihrab is an acoustic device, a resonator for the voice, shaped to bounce the sound back and magnify it at the same time.

Mihrab of mosques with wooden minarets keeps same shape and function but the decorations and construction of it is simpler. Importance of mihrab is achieved with different decorations and shapes of it. Decorations are always colored in different colors like red, blue, green etc. The materials that can be used in construction of Mihrab are different, from wood, stone, bricks, etc.

¹⁷² Picture of interior of Šerefudin's White Mosque in Visoko. Picture was taken from web page: <http://visoki.ba/gallery/view/4>, on 20th April, 2015



*Fig.4.1.1. Mihrab of Atik Ali-pasha's mosque in Foča*¹⁷³

The mihrab of this mosque is a massive, stone and is located on the south-east wall of the mosque. Its width is approximately 2.93 and the height is approximately 3.60 m. It consists of a mihrab niche semicircular whose radius is about 1.0 and the height is approximately 2.80 m. The mihrab niche in the upper part has stone motifs carvings called mukarnase (stalactites). The entire surface of the mihrab part about niches is filled with dense bas-relief decoration of plant origin.¹⁷⁴

4.2. Mahfil

Almost all mosques with wooden minarets have Mahfil in praying space. That gallery is on the columns and it is used for muezzin and to achieve bigger space for praying (additional space). This space is small and it is usually on the side of the entrance wall connected with stairs. The height of these Mahfils is approximately 2.5 meters.

¹⁷³ Picture of Atik Ali-pasha's mosque in Foča. Picture was taken from web page: <http://kons.gov.ba/html/slike/1273436597.jpg>, on 20th April, 2015

¹⁷⁴ Informations are taken from Commision to Preserve National Munuments, web page: http://kons.gov.ba/main.php?id_struct=6&lang=1&action=view&id=2999 on 20th April, 2015

Mahfil is not just used for praying space, but also for better looking interior of mosque. On gallery there is a small part for muezzin, which can be on the middle or on the right side. The basic construction of Mahfils is achieved with wooden beams and columns, but also with marble and concrete.

Picture 4.2.2 represents mahfil in Behram-begs mosque in Tuzla. This object is constructed with different materials, from concrete which is used for columns, though steel that is used to connect columns and wooden beams. These wooden beams are made from laminated wood and have good static characteristics. The fence is made from glass to visually connect this part with the main part of mosque.



Fig.4.2.2. Mahfil of Behram-beg's mosque in Tuzla ¹⁷⁵

4.3. Minber

Minber is stepped pedestal positioned right from Mihrab. It can be found in every mosque, while mesdžids don't have. Minber have basic and common shape in all types of mosques. The entrance is on the front side with doors or without it. Stairs with side fence rise till pedestal who is covered.

Minber can be constructed from stone and wood and decorated with different profiles and paintings. The purpose of Minber is to Imam stands on it during Friday prayer (Džuma) when Imam delivers sermons (hutba) to congregation.

¹⁷⁵ Picture of mahfil in Behram-beg's mosque in Tuzla. Picture was taken from web page: http://www.rijaset.ba/index.php?option=com_content&view=article&id=554:nove-dfamije&catid=191&Itemid=220, on 20th April, 2015



*Fig.4.3.1. Minber of Behram-beg's mosque in Tuzla*¹⁷⁶

Picture represents the minber and the Imam on it, that is giving hutba while people are listening him. This minber is constructed in modern style, using laminated wood. It is important to say that the architect also used some elements of stone (mermer) in entrance to minber giving some traditional elements to this modern style.

¹⁷⁶ Picture of minber in Behram-beg's mosque in Tuzla. Picture was taken from web page: http://www.rijaset.ba/index.php?option=com_content&view=article&id=554:nove-dfamije&catid=191&Itemid=220, on 20th April, 2015

4.4. Munara (minaret)

Minaret is tall slender towers attached to the mosques from which muezzins call the faithful to prayer five times a day. Indeed, the minaret is one of the most characteristic forms of Islamic architecture.¹⁷⁷

The static model of this construction is vertical console with entrapment at a low point, burdened vertical centric load of dead weight and horizontal load (continuous) over the entire height of the building (usually earthquake and wind).¹⁷⁸

The number of minarets per mosque varies, from one to as many as six. They are constructed in a wide variety of forms ranging from thick, squat spiral ramps to soaring, delicate, pencil-thin spires. A minaret has one or more balconies, from which the muezzin announces the call to prayer, and a spiral staircase on the inside or outside. Often the minaret is square at the base, where it is attached to the mosque. Above this square base it may rise in a series of circular, hexagonal, or octagonal stages, each marked by a projecting balcony.

At the top is a bulbous dome, an open pavilion, or a metal-covered cone. The upper parts of the minaret are usually richly decorated with carving. The steps may be internal or external. In most modern mosques, the adhān is called from the musallah (prayer hall) via microphone to a speaker system on the minaret. The basic form of minarets consists of three parts: a base, shaft, and a gallery.

The materials that are used for construction of minaret are different, and varies from location, topography, type of mosque etc. The most common materials used in construction are: stone, wood and concrete.

¹⁷⁷ Johnatan M. Bloom- *Minaret: Symbol of Islam*, 2002

¹⁷⁸ Amir Čaušević, PhD dissertation – *Arhitektonsko - konstruktivne koncepcije tornjeva sakralnih objekata – ponašanje na atipične pobude*, Sarajevo;



*Fig.4.4.1. Minaret of Lakišića mosque in Mostar*¹⁷⁹

Lakišić mosque is one of the youngest, but also the most beautiful buildings of its kind in Mostar, built in the Turkish period. It was built of cut stone and hipped roof panel. Along the right wall was built a stone minaret with height of 26 meters. The mosque was built in 1651 as it can be seen from the tarih above the entrance.



*Fig.4.4.2. Minaret of Mosque in Špionica, Srebrenik*¹⁸⁰

¹⁷⁹ Picture of minaret of Lakišića mosque in Mostar. Picture was taken from web page: http://www.rijaset.ba/index.php?option=com_content&view=article&id=554:nove-dfamije&catid=191&Itemid=220, on 20th April, 2015

The total height of this minaret is uncommon but the shape and the materials that are used are fascinating. The architect used one steel column like basic construction adding additional elements like stairs around it.

5. Project – Mosque Babin Do Bjelašnica

5.1. Location – site

Bjelašnica is a mountain in central Bosnia and Herzegovina. It is found directly to the southwest of Sarajevo, bordering Mt. Igman. Bjelašnica's tallest peak, by which the whole mountain group got its name, rises to an elevation of 2067 meters (6782 feet). Other notable peaks are Krvavac (2061 m), Mali Vlahinja (2055 m), and Hranisava (1964 m). The Bjelašnica range is bordered by the Rakitnica in the south, the Neretva in the west, Mt Igman in the north-east and Mt Ivan in the north-west. Only at 20 minutes distance of Sarajevo, it is a popular tourist attraction for hiking and skiing.

Geologically, Bjelašnica is part of the Dinaric Alps and formed largely of secondary and tertiary sedimentary rock, mostly Limestone and Dolomite.

The white snow cupola of Bjelasnica is a familiar sight from the higher points in Sarajevo in the period from mid-October until early June. Bjelašnica's base is largely forested - mixed forest, mostly beech - however there are no trees above the 1500 meter (4921') tree line.

¹⁸⁰ Picture of minaret of Mosque in Špionica, Srebrenik. Picture was taken from web page: http://www.rijaset.ba/index.php?option=com_content&view=article&id=554:nove-dfamije&catid=191&Itemid=220, on 20th April, 2015

During the 1984 Winter Olympics, Bjelašnica hosted the men's alpine skiing events, where brash Bill Johnson (USA) won the downhill after boldly predicting victory, overtaking Swiss ski legend Peter Müller who took silver. The American twins Phil and Steve Mahre took gold and silver in the slalom at Bjelašnica for the US as well. Switzerland's Max Julen surprisingly took the gold in the Giant Slalom, while the silver went to the Yugoslav favorite Jure Franko. Major investment was done by the Yugoslav authorities in order to accommodate the Winter Olympics.



Fig.5.1.1. Babin Do Bjelašnica ¹⁸¹

¹⁸¹ Picture of minaret of Babin Do Bjelašnica. Picture was taken from web page: <http://www.bjelasnica.ba/home>, on 20th April, 2015



*Fig.5.1.2. Babin Do Bjelašnica- location*¹⁸²

The site location is in the middle of complex Babin do near famous hotels Maršal and Han. This location provides a good position for object and it is necessity for this region.

A numerous benefits will be achieved with this religious object. From different tourists that like to have religious objet to people that live with religion and the mosque is the everyday necessity for their life.

5.2. Concept- idea

¹⁸² Picture of minaret of Babin Do Bjelašnica. Picture was taken from web page: <http://www.bjelasnica.ba/home>, on 20th April, 2015

After all research about mosque (in the world and in Bosnia) and the location in Bjelasnica - Babin do, the design and idea of mosque is not easy to define.

The numerous project where done in world to represent different cultures and their styles in religious objects. The examples are showed during the presentation.

The aim of this project is to create a mosque that will be representation of all this architectural characteristics that mosque must have but in manner of Bosnian architecture and characteristics of this kind of architecture. Also it is very important that location is on mountain Bjelasnica that have different architectural styles and because of ground level that Bjelasnica has.



Fig.5.2.1. Babin Do Bjelašnica Mosque

The concept represent traditional mosque that is “covered” with new materials, new modern architecture. This concept relies on the reasons that Qaba have also covered which is added (changed) every year. The second one is because of mountain Bjelasnica. In the winter there is a snow but in summer there is no. Bjelasnica is having also “cover”.

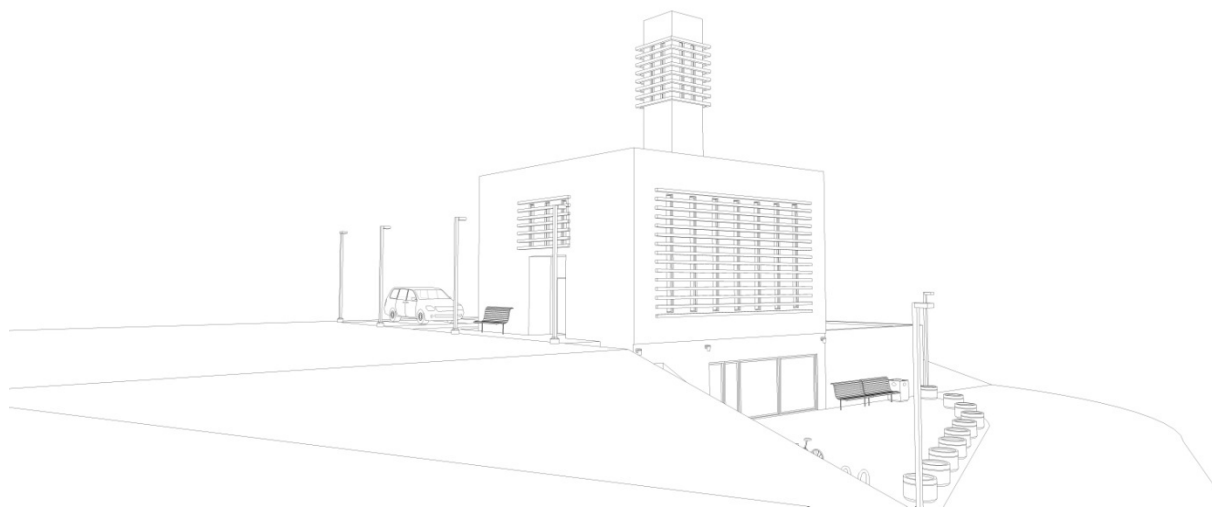


Fig.5.2.2. Babin Do Bjelašnica Mosque



Fig.5.2.3. Babin Do Bjelašnica Mosque

6. Conclusion

Does Bosnia and Herzegovina possess unique architectural mosque style that is influenced by domestic materials and structural forms? During time and different occupant of the country, mosques were built in this region. The climate, the rulers, the architects, designers, materials, structure, Bosnian people etc. gave unique style to mosques. These are some of the reasons why research paper will be done on this theme to investigate about all factors that are influenced on mosque design in Bosnia and Herzegovina Including materials used and possibly specific structural aspects. The previous scholars that wrote different works on theme mosque did not discuss about this interesting question.

Bosnia and Herzegovina possess unique architectural mosque style that is influenced by domestic materials and structural forms. Hypothesis that is stated above assumes that Bosnia and Herzegovina possess unique architectural mosque style. In the first part, this research paper examine the history and beginnings of mosque design in Bosnia as well as applied materials and structural forms. The second part examines different types of mosques that are built in this territory during history. The last-final part analyzes Bosnian mosques and mosque design styles presenting different mosques and their basic parts.

Conclusions obtained from the present study are the following:

- Bosnian mosques have characteristic architectural style influenced by structural system and applied materials
- Bosnian mosques were done by skilled workers and craftsman's who gave better construction and architectural appearance using different materials and techniques
- Different parts of Bosnia have different styles which are highly influenced by the climate, topography, people, materials available, the wealth of the region, importance for the state, etc.
- Hipped roof which is the most used type of roof in Bosnia is frequently used in mosque design
- Stone in Herzegovina, which is used like common material for construction, is used for mosque construction in that parts of country
- Modern mosques that were built recently represent characteristic Bosnian style which is proven by wining numerous architectural awards

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Forming the national architectural identity of Bosnia and Herzegovina throughout old village architecture: Elements of village houses as inspiration for national pavilion construction

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Abstract:

Ever since the late 1800's and the emergence of the Crystal Palace in London, there is a rapidly growing phenomenon of the architectural creation emerged in the artistic and promotional purposes, particularly on behalf of nations themselves. Existence of the Venice Biennale, World Fair and Expo set up the complete new platform for the development of creative architectural and artistic articulation, mostly described as the most fertile ground for architectural experimentation. During its history, those art events had a shift from the objects of architectural admiration toward the object of national branding and representation of national identity.

In the context of Bosnia and Herzegovina, the strongest and the most unique characteristics for the creation of national architectural identity should be derived from old village architecture, neglected for centuries and almost brought to permanent destruction and deletion within certain geographical areas. For example, to the old Bosnian village house with a room in the roof space, as well as to the other types of rural houses of the rich architectural heritage of B&H, is unjustified given little attention, not even close to that of other European countries have turned to their rural architectural heritage.

The objective of this paper is to research and investigate the old Bosnian village architecture, mostly presented through unique appearance of the family residential house, and its significant yet representative elements. Furthermore, it is important to briefly elaborate on the national identity as the form of the national branding in the context of the world expositions. At same this paper will pay attention on the comparison of the investigated elements of mentioned village architecture, focusing on the old Bosnian village house with the chardak in the roof space, and their potential usage in the design and creation of the national pavilions for any kind of world exposition art events.

Keywords: pavilion, vernacular architecture, village house, heritage, national identity, chardak.

Introduction

"I would call Bosnia as spiritual homeland, and when you name some place in that way, you have admitted everything! Bosnian people used the power of their skills to create their own customs, humour, games, songs, puzzles and legends, its eglen¹⁸³ - and way before other people loudly praised their deep spiritual hinterland."¹⁸⁴

In its centuries-old tradition Bosnia and Herzegovina inherited the different cultures, traditions and architectural expressions. Through each migration local inhabitants kept their characteristic features, and adopted new trends and elements, making this one of the richest culture on European soil. At the same time, the inhabitants, driven by the challenges of life and places in which they lived, developed characteristic and unique architectural phenomenon, at the same time developing in a specific formal expression and appearance, extremely well-recognized mid-20th century by the biggest names of Bosnian architecture. Rudolf Meringer, Josip Pospišil, Jovo Popović, Juraj Neidhardt, Dušan Gabrijan, Muhamed Kadić, Astrida Bugarski and Džemal Čelić, are just some of the pioneers whose research engagement lifted from the world of old Bosnian village architecture, and thus preserve examples of elements which, without question, represent a good part of our, BH's national identity.

Ever since its emergence, the old Bosnian village architecture is definitely retaining its importance. First of all, the village house is a valuable document for the creative abilities of the people, local residents. Our entire country, is a treasure trove of many types of historical village houses and in this respect we are richer than many other, otherwise, rich and developed countries. At same time, based on the introduction words by Bosnian and Herzegovinian Nobel prize winner, that richness emerged much longer than in the other European countries.

¹⁸³ Eglen – turkish word for toggle; (noun) - toggle, talk, entertainment in friendly conversation; (verb) eglendirisi - to talk;

¹⁸⁴ "Ja bih Bosnu nazvao duhovnom domovinom, a kad nekom kraju date takvo ime, sve ste priznali! Bosanski ljudi su prema snazi svoga umeća stvorili svoje običaje, humor, igre, pesme, zagonetke i legende, svoj eglen – i to mnogo pre nekih drugih naroda koji se na sav glas hvale svojim dubokim duhovnim zaleđem." – Ivo Andrić

Heart shaped country called Bosnia and Herzegovina

In order to properly understand the Bosnian and Herzegovinian identity, it is important to go back to the history, due to the fact that this area was exactly the crossroad under the



Figure 8: Map of the Bosnia and Herzegovina, showing its position on the Balkan peninsula.

influence of many different empires and flags.

Geographically, Bosnia and Herzegovina includes a central part of the western part of the Balkan Peninsula and consists of two units in the north of Bosnia and Herzegovina in the south. They make all, geographic, natural and historic parts, which later, with shared life and history became linked, and now make up the state of Bosnia and Herzegovina. Name Bosnia first appeared in the mid-tenth century documents in the file of the Byzantine

Emperor Constantine Porphyrogenitus¹⁸⁵, and refers to the area around the upper course of the eponymous river, to which it seems was named. Name Herzegovina comes from the title of Duke (Duke). This title appears to us through the Croatian-Hungarian kings, and in the documents appears in 1449 in the title of Duke Stephen separated from south region of Bosnia from the rest and declared: "Hercegst. Sava, lord of Hum and the Coast ...", and later a country which is ruled by HercegStjepan¹⁸⁶ called Hercegovina. Until then, the country was called Hum.¹⁸⁷

Contemporary territory of Bosnia and Herzegovina has evolved from two historical core, one in the valley of river Bosnia, and the other in the valley of the river Neretva. Today's border of Bosnia and Herzegovina was established during the eighteenth and nineteenth centuries a series of peace treaties, after the Ottoman defeat and defensiveness. In these borders Bosnia and Herzegovina remains at the time of the Austro-Hungarian occupation in 1878 and later annexed in 1908. At the time of the first Yugoslavia (1918th to 1941st) Bosnia and Herzegovina has not existed as a separate administrative unit. Decisions of II Session of AVNOJ¹⁸⁸ in 1943 Bosnia and Herzegovina was removed, in the framework of the second Yugoslavia, as a separate federal unit with the borders of 1918. With the later less territorial adjustments (Sutorina) Bosnia and Herzegovina today occupies a territory of 51 564 km², of which on Herzegovina goes 9119 m².

According to the latest census data (1991) in Bosnia and Herzegovina lived 4,377,033 inhabitants. Bosnia and Herzegovina is not a homogenous state, therefore her members of the three South Slavic ethnic neighbouring indigenous peoples: Bosniaks, Serbs and Croats, make up 97.6% of the population and members of other non-Slavic Slovenian and ethnic (national) minorities, together make up 2.4% of the population of Bosnia and Herzegovina.¹⁸⁹ In 2014. Bosnian and Herzegovinian government conducted new census, but the results are going to be published in spring of 2015, with the notable reduced number of inhabitants, and more or less reduced national structure, due to the war event and genocide between 1991 and 1995.

¹⁸⁵Constantine VII [Porphyrogennetos](#) or Porphyrogenitus was the fourth [Emperor](#) of the [Macedonian dynasty](#) of the [Byzantine Empire](#).

¹⁸⁶Stjepan Vukčić Kosača (1404–1466) was a medieval [Bosnian](#) duke that ruled a hereditary region in [Hum](#). He was a member of the [Kosača noble family](#).

¹⁸⁷ Hadzidedić, 1997, p.1

¹⁸⁸ The Anti-Fascist Council for the National Liberation of Yugoslavia, known more commonly by its [Yugoslav](#) abbreviation AVNOJ, (Antifašističko Vijeće Narodnog Oslobođenja Jugoslavije) was the political [umbrella organization](#) for the national liberation councils of the Yugoslav resistance against the [Axis occupation during World War II](#).

¹⁸⁹ Hadzidedić, 1997, p.3

Traditional Bosnian village architecture

The old Bosnian village architecture is a reflection of cultural - historical, socio - economic and technical developments. It is a specific image of the eternal human aspirations that one of the basic functions of your life - housing - adapt to these events and changes thereto. When composing his residence in accordance with the natural, social and technical conditions, the man, along with it, is changing some of these conditions. Gradually he dismiss its conflict with nature, developing more adequate forms of organization of family and social life and the economy, improving the techniques of construction and physical creation.



Figure 9: Lukomir village on Bjelašnica mountain, one of the most representative examples of vernacular architecture

For this wealth we need to thank first of all to our past, ordeal and rich historical events. On this constant Balkan windswept, exposed to constant fighting, violence, looting and arson, the migrations, movements, mutual interference and interference with other nations, in the transmission of influence, domestic and foreign, in the amalgamation and adapting to these impacts, in the struggle with nature and scarcity, our constructive people were trying to find solutions to questions that harsh environment demand from them. On the other hand, our national architectural creations are rich not only in numbers but also in terms of inventiveness to define functions, solving spatial, formal and structural problems. Although many of these creations remained only on the initial

sketches and unfinished architectural torso, which is due to different reasons, our duty, as its inhabitants and as architects, to familiarize others and ourselves with this wealth.

The types of the village houses

During the 20th centuries, many authors were dealing with the issue of classification and typology of the Bosnian and Herzegovinian village house. Some of them are stating that the village house could be divided on: wooden examples, stone examples and different variations of the adobe and plaiting¹⁹⁰. This classification was further developed on the wooden, stone and earth house, followed by the examples that are representing the mixture of several categories¹⁹¹. According to the roofing, Dedijer, divided the village house on the: straw covered, stone covered and wood covered¹⁹², while Karanović¹⁹³ used religious prefix to classify them into Muslim, Orthodox and Catholic village house. But taking the position that neither the material and religious background could be the proper criteria for such an important classification, but the important visual and structural elements used for their construction, I was deeply attracted by the Kadić(1967) differentiation.

According to MuhamedKadić (1967), Bosnia and Herzegovina, owing to its historical and geographical position, represent one of the most important collection of historical village houses in South East Europe. Therefore, according to their architectural characteristics, and based on the research conducted in more than 300 villages, he classified them into several categories:

- 1. Primitive temporary shelters**
- 2. The primary single roomed permanent shelters**
- 3. Multiroomed wooden single-storey house**
- 4. Multiroomed stone single-storey house**
- 5. One and a half storey wooden and stone houses**
- 6. The wooden and stone storey house¹⁹⁴**

In his book “Old village house in Bosnia and Herzegovina”¹⁹⁵, Kadić is showing the subcategories of these dominant types of village architecture, clearly expressing their important features and significant elements. The characteristics types of these houses were developed in strict dependence on natural, technical and social condition, and

¹⁹⁰Cvijić, 1931, p.353

¹⁹¹ Špiro, 1932.

¹⁹² Dedijer, 1909.

¹⁹³ Karanović, 1927.

¹⁹⁴ Kadić, 1967, pp. 20-74

¹⁹⁵Kadić, M., (1967), *Starinskaseoskakuća u BosniiHercegovini*, Zagreb, Vijesnik;

distinctive difference could be notice, although there are some regions where those types were mixed as well.

Primitive temporary shelters were used as temporary shelters for shepherds on the mountain pastures, and they are dating from very ancient times, kept until today. In this group there are: *kreve* (on sledge movable huts used overnight; Figure 3), *summer huts in the mountains* (temporary huts for summer settlement of shepherds; Figure 4), *pile dwellings* (the house resting on logs, on river banks; Figure 5) and *the bunja* (characteristic hut for the Mediterranean area, with archaic technique of vaulting; Figure 6).

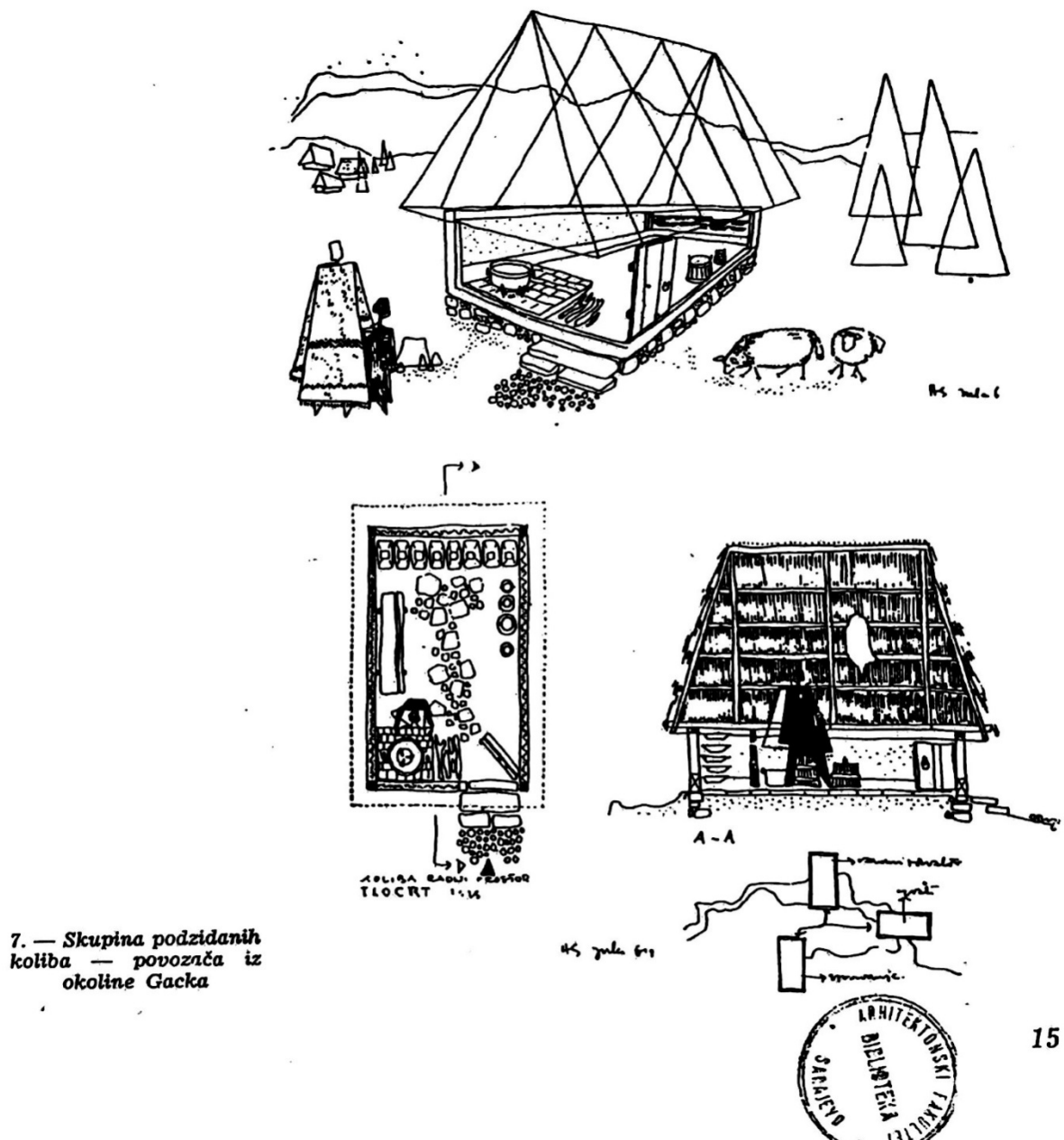


Figure 10: Set of the "povozača" type, more advanced version of the basic type "kreve". Example from the Gacko area.

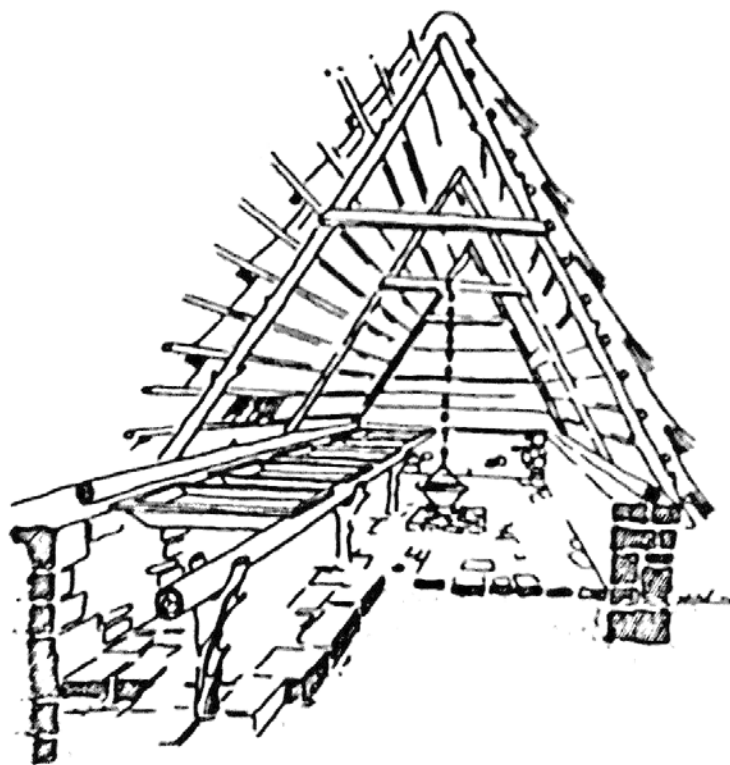


Figure 4: Summer shepherd hut from Oblja area.



Figure 5: Sojenice – the house resting on logs, on river banks. Example is from Ripač area, near Bihać, announced as one of the National Monuments of Bosnia and Herzegovina.

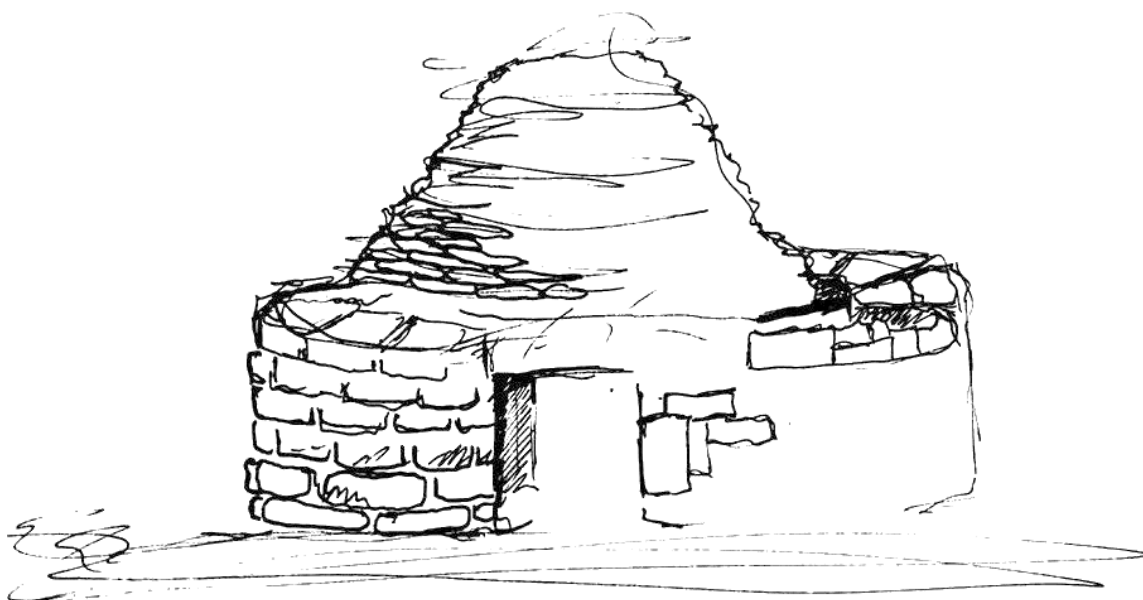
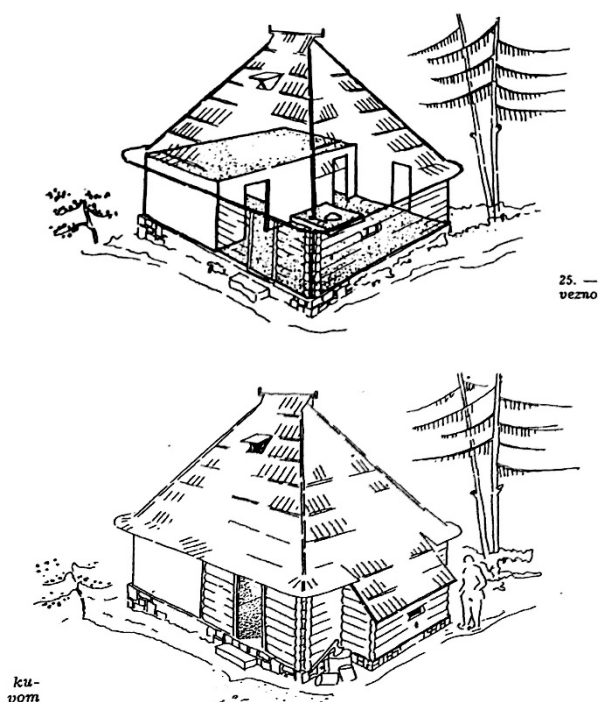


Figure 6: Bunja – huts from the Mediteranina area, mostly present on the south of the Bosnia and Herzegovina.



The primary single roomed permanent shelters were made of logs, with the square plan and one room completely opened to the roof. In the houses with more rooms there was difference in conception between a wooden house on one hand and stone house on the other hand. The first one was enriched with the division of the space inside, on the central part, where there is a room and so called “hearth”, or where room is divided into two smaller rooms.

Furthermore, this house type had changes in the shape of the plan, going

Figure 7: a. Wooden single storey house, with the basic spatial division; b. Wooden single storey house with the annex;

from square to rectangular, but still remaining smaller size. In order to be harmonized with the surrounding, those houses had high hip wooden roof. Evolution of this type had two paths: one by adding the rooms as the extension on the house, either by adding the room in the roof space. The second one, made out of stone, is way more narrow and oblong, with the gable roof covered with the stone slabs, sometimes even four-hip roofed. The development of this type, from single room toward multiroomed had one interesting feature, curtain wall made out of the straw, which divided the cattle from the living space. Disadvantage was not as many possibilities for variation in plan as with the wooden ones, but the extension in form of the annexes was way more suitable. In the transition areas, there was notable mixture of wooden and stone house. By adding the cellar or an attic room (or adding both of them at the same time), there was a notable development from the single storey to the one and a half storey house. There are several examples that could be distinct: *the wooden single storey house over a cellar* (standing perpendicular to the site so the cellar could be developed under the room, providing the entrance to the main house from the highest part), *the stone house over the konoba* (cellar stands under the longitudinal side of the house, therefore both cellar and dwelling area are accessible from various levels), *the wooden house with an attic room* (placing the attic over the ground

floor, integrated into the roof structure, usually having several evolutions: with the attic on the both sides of the roof, with the attic accessible from the outside, or with the attic accessible from the gallery). This evolution from a single storey, over one and a half storey village house, brought Bosnian constructor to the another house type, again made out of the wood and stone, called *storey house*. Under this category there are several distinctions as well: *the wooden storey house with a cantilevered first floor* (again influenced with the necessity of dividing the cattle area and dwelling space, providing the necessary approach from the outside, but yet keeping some of the functions on ground floor, such

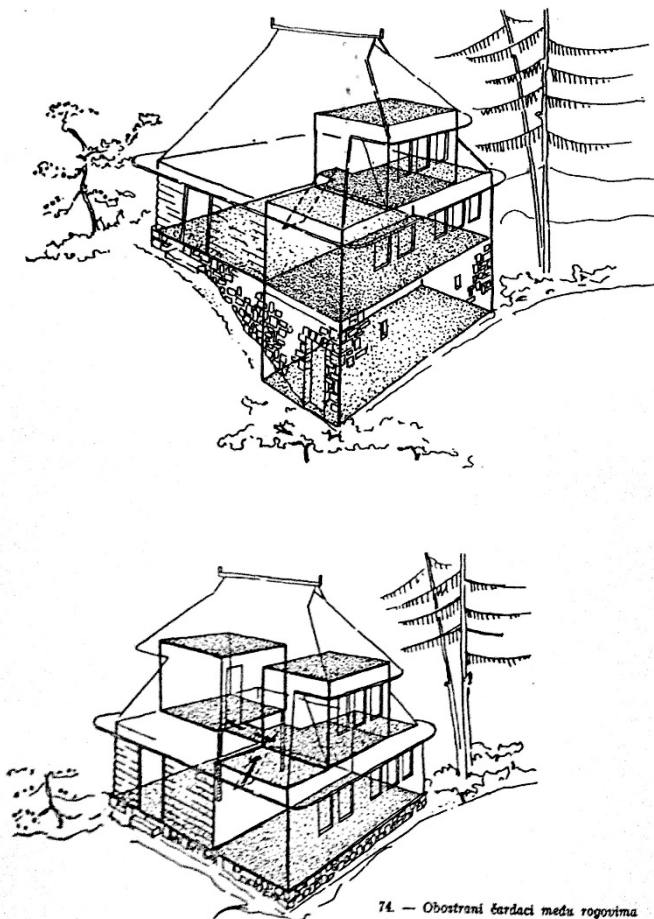


Figure 8: a. The old village house with the attic (chardak) in the roof space over the main room; b. The old village house with the chardak on both sides.

as washing and water closet), *the smoke shaft house* (specific type of wooden storey house with the smoke shaft on the roof, designed to carry out all smoke from the inside of the building, as well as for the smoking of meat and drying of the skins; at the same time this type of the village house had veranda extensions, for better functionality) and *storey stone house* (rare type of the village house that appears as a result of narrow compounds; supplied with the stairs shifted on each floor). Those storey houses easily appeared under the different influences, such as sloppy site or cantered town position, again leaving enough space for mixture of all of them, on transitional areas and under the different circumstances.

The multitude and variety of architectural solutions of village architecture is apparent at first glance. So, there are types of houses typical of the various settlements, so the houses in these villages are strictly standardized. Furthermore, the boundaries between certain types are not always clear and crisp, but are manifested in two ways: somewhere at crossings occur blended house made of two or more adjoining types, while elsewhere occur intermediate forms, formed by mixing and interpenetration of elements taken from various types.

The old Bosnian and Herzegovinian village house with the chardak¹⁹⁶ in the roof space



Figure 9: House with the chardak in the roof space of Čamdžić family, village Puračić, near Lukavac.

Old Bosnian village house with chardak in the roof space is unique type of the village architecture, both in its outward appearance and spatial division, and is one of the most distinctive types of Bosnian traditional home. This valuable piece of architectural art of the builders of the Bosnia and Herzegovina, once widespread in the hilly and mountainous region around the river Bosna in the past was home to the residents of this area, and a perfect creation of the once rural housing. This type of the house was unique by the appearance, if we exclude the annexes and widening of the houses that was necessary with the increasing of the families, but the only differences that were noticed were related to some of the people who have inhabited (Bosniaks, Serbs, Croats) but these changes are mainly reflected in the design of the interior space and through everyday activities.¹⁹⁷

¹⁹⁶ Chardak – derived from turkish language, room on the upper floow, enclosed porch (Glossary of Turkish words - Kadić, 1967, p.180)

¹⁹⁷ Bugarski, 2007, p. 6.



Figure 10: House with the chardak in the roof space of Musić family, village Goletići, near Kladanj.

Old Bosnian village house with the chardak in the roof space has got unduly little attention. Not only that denial of such treasure led to disappearance of the last copies of it, but what is published rarely possess adequate documentation. Authors such as Muhammad Kadić or Astrida Bugarski, exploring bundled parts of our beautiful Bosnia and Herzegovina managed to save from oblivion and the last examples of architectural design that

is truly important part of the architectural identity of BiH, and a necessary element in shaping of widely discussed national identity.

Old English village house with the chardak and the roof is interesting because the concept development and evolution of the area went up from the ground floor to the roof space. There is clearly an aspiration to make better use of large volumes of roof space above the wooden houses.¹⁹⁸ Adding chardak in the roof is the unique way that preserved the previous frame chalets of structural dimensions and changes, and tapping into the roof forms and constructive preserve the unity of the roof above the bungalows. Despite this, fantasy of the next builders has found wide possibilities to keep chardak and integrate them, as well as in shaping the internal living space.¹⁹⁹

It is important to mention that archive and sources that are gathering some of the remaining examples of this architectural jewel are really rare. At the beginning stage of this research it was extremely hard to find pictures of the houses, although main features and characteristics were gathered at some literature from the bibliography. Therefore analysis was quite challenging, and made further paper development much harder. At same time, I realized why such publications are important for fostering of heritage and building of national identity, especially one that is unique, as village architecture is.

¹⁹⁸ Kadić, 1967, p. 50.

¹⁹⁹ Kadić, 1967, p. 52.



Figure 11: Ground floor house with the chardak in the roof space, village Milišići (slopes of Bjelašnica).

Elements of the old village house with chardak in roof space as inspiration source

In the rich treasury of Bosnian architectural heritage the old village house with the chardak in the roof space has a special place because of physical development of attic space, but also because of its characteristic exterior. Based on what I mentioned in the previous chapter, it is clear that it differs from the widespread and at the same time built ground storey and half storey dinar chalets and its derivatives in that they had one or two attic guest room.²⁰⁰ This attic guest room, usually constructed and designed as the sleeping space for youth and young family members, either young couples, or guest and visitors, was widely called “chardak” in the roof space, or for the whole house type “čardaklija”.²⁰¹ Therefore, this element is the most representative and visually most interesting part of this village house type. Beside visual appearance, chardak deserves special attention due to the reasons of his emergence and the ways how it became integral part of one, sophisticated in construction and gasping in appearance, village house type.

²⁰⁰ Bugarski, 2007, p. 11.

²⁰¹ Čardaklija – derived from the „chardak“, common name for this house typology in the area of Nikšić mountain, in the area of Vareš and Banovići, and around Spreča river.

The old village architecture emerged as necessity. Functional living space that will fulfil all needs of average village family and their daily activities was the primary driving force for construction. Influenced with the surrounding area, local materialization and creativity of the local builders it represent pure yet sophisticated architectural expression of one period that was kept in the house design even after its own golden period. Beautification of the exterior appearance was only requested in the coherence with the nature and typology of the site, therefore the rich exterior expression came out from the needs of the human beings. Nevertheless, since we are talking about the specific crossroad of the cultural exchange and enormous historical influence, this type was further developed and overtaken in the other styles of the Bosnian and Herzegovinian traditional construction.

Unfortunately, examples of old village architecture were preserved just in several cases, and villages that are having those priceless examples are almost not existing. Several efforts to preserve this unique approach for the architectural design were present, but the ravages of time and necessity of villagers to keep up with the contemporary trends (more likely the lack of taste and need for showing off, general problem of the present day architecture, especially in the post-war societies such as Bosnia and Herzegovina) completely destroyed not only the physical existence of the village house and precious chardak in the roof space, but the knowledge of the existence of such house typology as well.

This paper, based on the assumption that there is necessity for the overtaking of the original elements of the Bosnian and Herzegovinian architecture and their proper usage in the building of the national architectural identity theoretically, and construction of the national pavilion physically, is trying to protect this important example of vernacular housing and architecture in general, and its incorporation into the modern and contemporary tendencies of the present day architectural design.

Passing through numerous examples of rural architecture, analysing them and highlighting significant elements, I came to the conclusion that the following elements could be an important part of the future of the architectural design, specifically based on the construction of the Bosnian-Herzegovinian national pavilions, and based exactly on the old village architecture, with the accent on the House with the chardak in the roof space:

a. Chardak

Above highlighted element that gave name to this house typology, very carefully incorporated into the roof structure yet using the waste of the attic space and offering visual, functional and structural synergy. Deserving special attention, chardak could be an

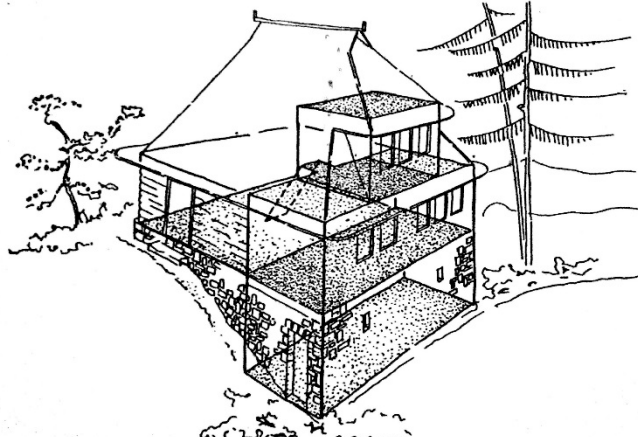


Figure 12: Chardak in the front elevation of the village house, placed above sleeping units.

amazing asset to the shaping of potential national pavilion used and presented in the contemporary manner. Examples how chardak is attached as annex to the building design could be:



Figure 13: a. b. House by El Dorado Studio; c. VitraHaus by Rem Koolhaas; d. House Bierings by Rocha Tombal Architekten;

b. Extension without affecting main volume

Extremely interesting feature of the old village architecture and the builders who were signing their construction was the extension of the main building (if necessary) only in the way to preserve the original, square or rectangular plan, without disturbing the structure and other elements.

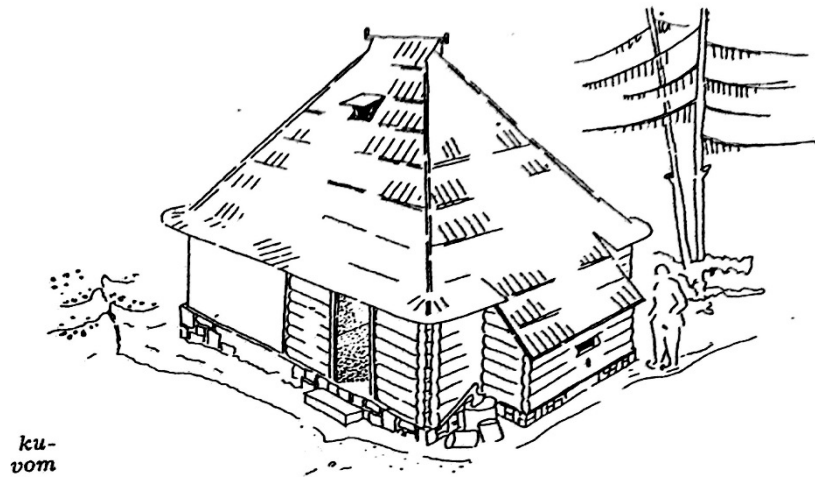


Figure 14: Annex on the primary ground storey village house – without affecting main volumen and square like plan.

c. High hipped roof

One of the most important features of the village architecture, due to the climate and surrounding impact. High hipped roof was also used as the space for innovation, because the evolution of the primary one storey village house into the house with the chardak, and dimalučara as well.

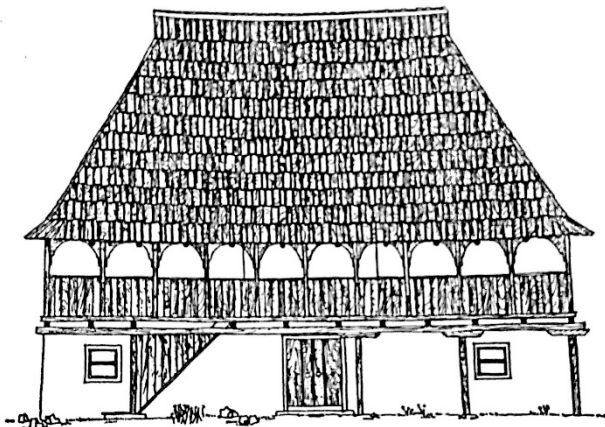


Figure 15: Dimalučara Lokvančića, Hrasnica, Sarajevo.



Figure 16: Riverside Museum by Zaha Hadid.

d. Central place

Organization of the interior, starting with primary ground storey village house was based on the central place, usually marked with fireplace, and later on divided with wooden and straw partitions, light in structure.

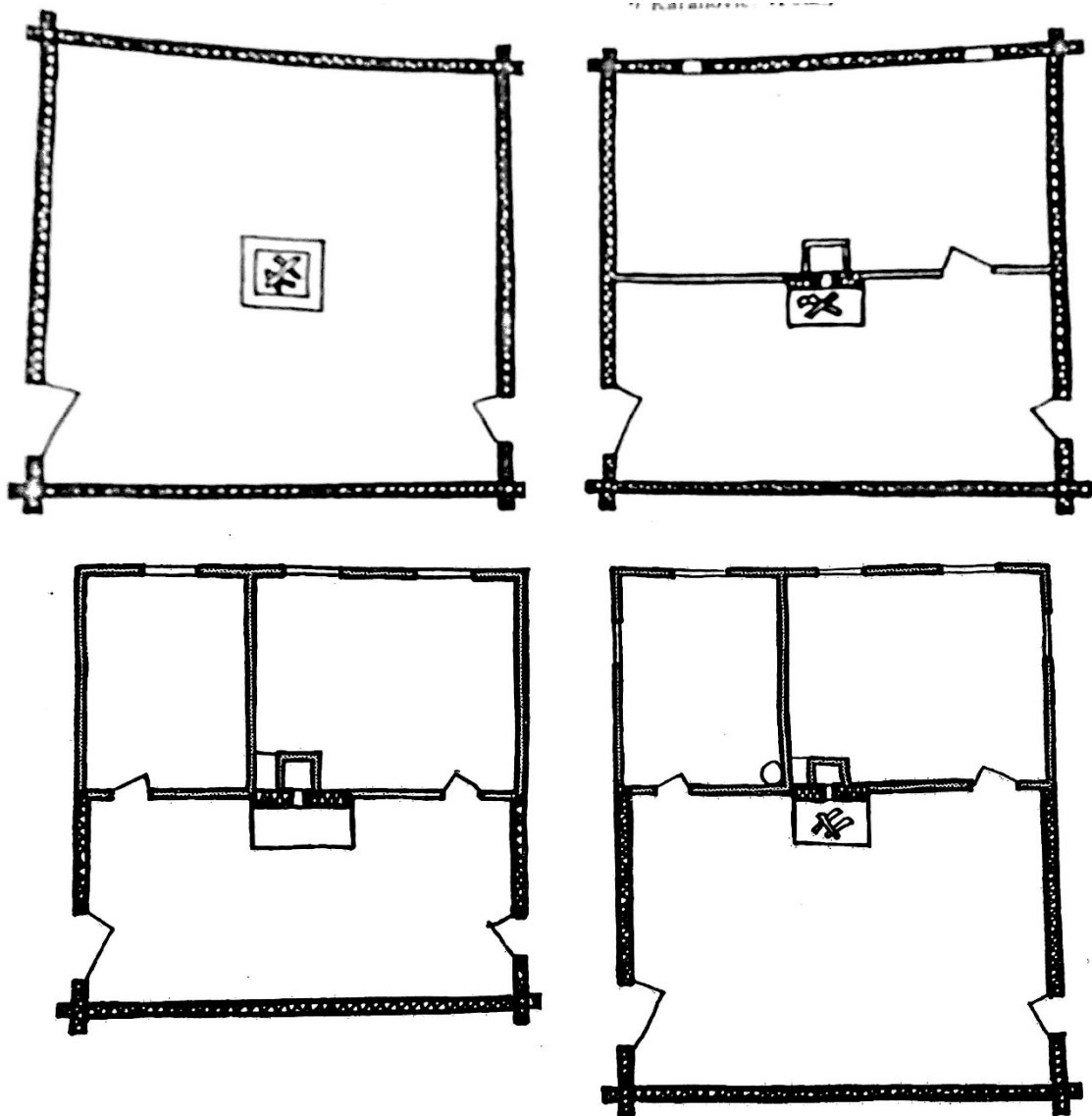


Figure 17: Open plan from the single storey primary village house, throughout stages of development – division of the space around the fireplace (central element);

e. Wooden structure

Logically the most common material for the construction of settlements in the village area, easily incorporated within the natural surroundings and at same time presenting important and strong structural element. This element could be the strong expression in any kind of the design, since the structure is very often use as the visual element as well (extremely visible in design of Santiago Calatrava, or in the case of Australian Pavilion at the World Expo in 1970, Osaka). Piles, timber beams and wooden columns, with or without covering would be an amazing asset for the construction of some contemporary yet sophisticated structure, daring in the intention and gasping in the appearance.



Figure 18: Some of the remainings of the old village architecture, showing the structure of the building itself, village Lukomira, Bjelašnica.

f. Balance with the surroundings

Harmonization of the materials and the volumes with the surrounding nature in the Bosnian and Herzegovinian hills and villages was something that local builders used as must. By chance, by need or by visual understanding, they set up the good standards

(although not necessarily always followed) for the balancing of the humans creation and nature.

Conclusion

The present paper has been written with a view to show the way by which we could eventually arrive to point of construction proper architectural national identity and construct our own national pavilion at some of the world exposition events. Traditional and old village architecture served as the fertile soil for the derivation of the important elements, pointing out the importance of incorporating such architectural creation within the identity itself, referring to the old village house with the chardak in the roof space. At same time, effort was on the preservation of the information and written resources about the house type, as the symbolic gesture of rejection of neglecting the part of our history and constant destruction of such unique architectural expression. Unfortunately, examples of old village architecture were preserved just in several cases, and villages that are having those priceless examples are almost not existing.

Yet the aim of this paper was not to show or offer national pavilion design, either propose the concrete shaping elements for the construction of the same, but to invite the attention of the readers to the more careful and human treatment of our heritage, and point out the base for the future shaping of such architectural creativity.

Once more, this paper, based on the assumption that there is necessity for the overtaking of the original elements of the Bosnian and Herzegovinian architecture and their proper usage in the building of the national architectural identity theoretically, and construction of the national pavilion physically, is trying to protect this important example of vernacular housing and architecture in general, and its incorporation into the modern and contemporary tendencies of the present day architectural design.

To sum up, the village house is a valuable document for the creative abilities of the people, local residents. Our entire country, is a treasure trove of many types of historical village houses and in this respect we are richer than many other, otherwise, rich and developed countries. Emergence of all of these types was reflection of cultural - historical, socio - economic and technical developments. If we perceive them as the guidelines for update of our architectural national identity we will have perfect platform and unique state-of-art platform for the showcase in any of the world art events, representing country that for centuries had description of the European Jerusalem. And that national identity, inevitably, cannot be created without our village architecture, neither without traditional chardak elements.

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