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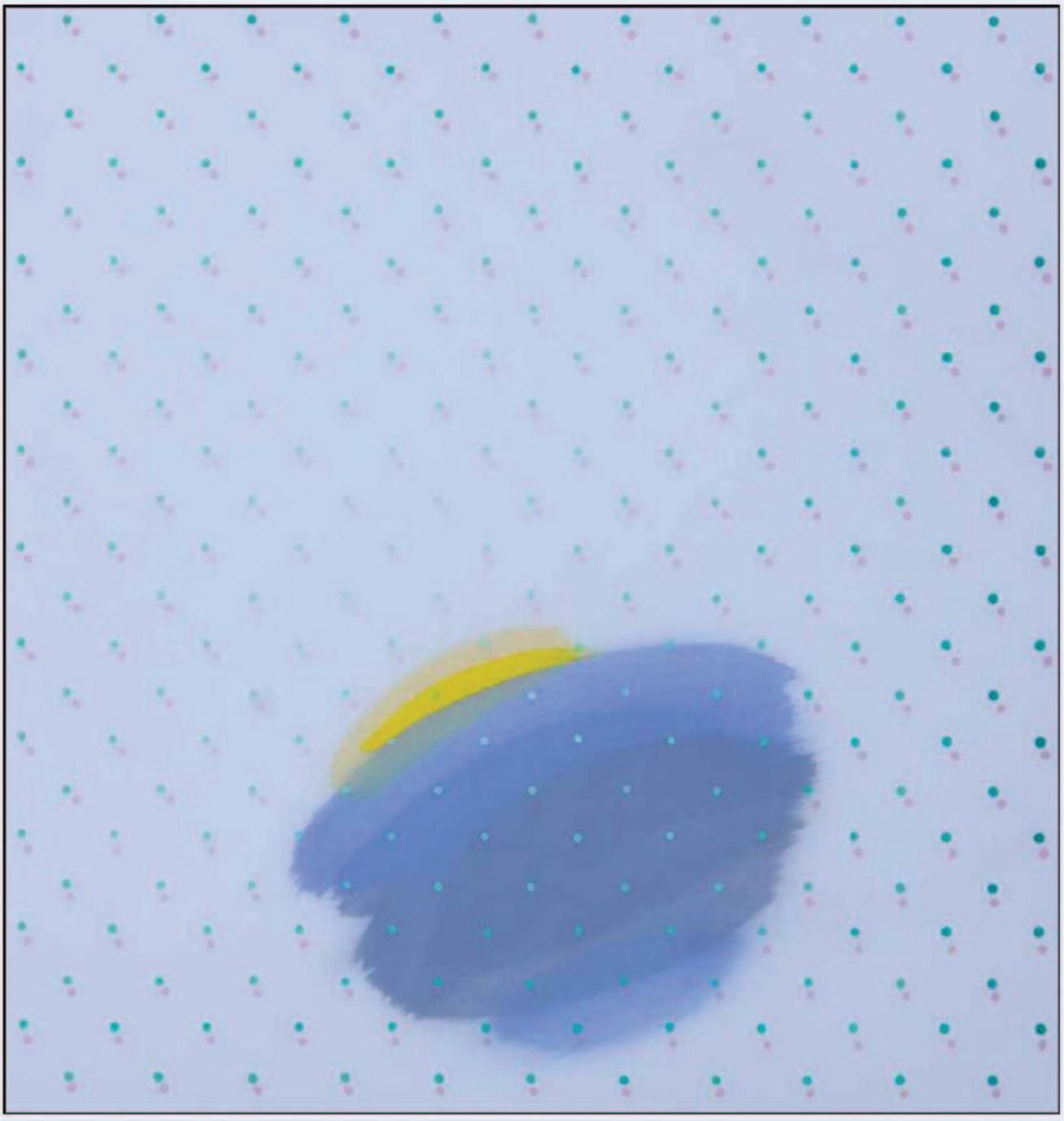

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EDITOR'S MESSAGE

It has been almost 350 years since the founding of the first scientific journals, the *Philosophical Transactions* in England and the *Journal des Sçavans*in France. Now, there are many diverse publications invarious scientific fields which have shown enormous development, both in terms of quantity and quality.

Over time, published scientific papershave heralded the development of societies and global welfare. New scientific findings, innovations and research methodologies have become the determinants of the advancement of humanity. Those publications have surpassed any ownership and crossed over the borders of the places where they were produced and emerged to build solid research in the interest of the advancement of the needs and interests of humankind.

In this spirit, as a result of our willingness to engage in contemporary scientific developments and debates, the academic staff of the Mother Teresa University, the youngest University in the Republic of Macedonia, decided to establish the International Scientific Journal "South East European Journal for Sustainable Development (SEEJSD)."

The editorial board of the Journal, constituted of researchers, experts and young scholars of various fields relevant to sustainable development, took the responsibility to consolidate and advance the content and quality of the Journal, to increase its scientific credibility and to align it in accordance with the requirements of the Science Citation Index (SCI).

The Journal will be published biannually and will include original peer-reviewed articles, book reviews and short essays, from various areas that have an impact on sustainable development. We believe that our Journal will contribute towards the enrichment of scientific thought and the affirmation of ideas in different fields from established and young researchers. We are also convinced that this scientific platform will affirm the new scientists and enthusiasts of our University to engage ininternational theoretical and empirical debates.

The editorial board of the Journal is well aware of the great challenges ahead. Undoubtedly, in order to produce a successful and effective Journal and make our contribution to the scientific community, a lot of hard work and commitment is required. I am certain that our board members, teaching and research in various universities and countries, will contribute greatly towards our goal with their experience and willingness to sustain the SEEJSD and its community. I take this opportunity to thank the members of the editorial board and welcome them to their important role.

Lastly, I would like to express my sincere hope that the "South East European Journal for Sustainable Development" will succeed in the realization of its mission to positively contribute to science, education and human development.

Editor in Chief,
Prof. Aziz Pollozhani, PhD

CAN WEMAKE A GREEN TOURISM BRAND? THE EVIDENCE OF MACEDONIA

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ABSTRACT: Every country has strengths and weaknesses, and a good brand may project country's strengths while recognizing its weaknesses. Despite the fact that Macedonia has been an independent countryfor more than two decades, it seems that it is still trapped in its transition period and still strives to create new patterns. The article draws on primary and secondary data to provide insights into the processes and conflicts over efforts to create a green tourism brand in Macedonia. Moreover, the research assesses how Macedonian hospitality industry stakeholders manage the environmental quality, which directly leads to increase of destination's competitiveness. It has a practical significance since it discusses the level of environmental quality of Macedonia as a base for creating a national green tourism brand. The paper underlines that tourism branding in Macedonia cannot be conducted successfully without considering the context of "green" tourism. It was found that the improved image along with the enhanced competitiveness are strong determinants, thus, provoking better interest than the increase of number of guests. Yet, a large number of surveyed hotel managers lack measures to reduce the conventional energy use and replace it with renewable sources of energy. Although being fully aware of the importance of the environmental concept, this is not the managerial priority of Macedonian hotels. These findings may assist in further steps when creating marketing strategies to enhance country's distinctiveness. A positive national image is an essential ingredient for promotion that raises the issue for necessity of investing into national branding as part of the image-building strategy.

Keywords: Environment, image,promotion, brand, green tourism

1 INTRODUCTION

The puzzle, which needs to be solvedso that the country can be more attractive, poses the issue of initiating the national branding process. It is known that every country has strengths and weaknesses and a good brand may project country's strengths while recognizing its weaknesses. Therefore, the purpose of branding is to position the country in the best possible way in the world system, giving its strengths and weaknesses, by simultaneously being truthful and believable.

Therefore, starting from the benefit that branding offers a differentiation in the market [1-4], to the dilemma what constitutes the branding process [5-7], branding provokes large interest. It is often reported as a kind of destination image [8-9] or analyzed as a process of destination positioning [10-11]. On the other hand, brands classifiable as green are those whose users' primary associations are environmental conservation and

sustainable practices [12].

Creating and developing a brand is not an easy task, so even developed countries do not find brand management an easy mission. Very few countries have successfully launched a national brand. Its inception evolved from various fields including imaging and communicating. It consists of international and external connections, based on the country's positive values and perceptions that are relevant to export development. The brand concepts, once researched, tested and defined, are then used as the basis of targeted promotional campaigns when encouraging tourism development.

Despite the fact that Macedonia has been an independent countryfor more than two decades, it seems that it is still trapped in its transition period and still strives to create new patterns. There is a lack of global image and bad prejudice, which may be a good sign and a rare opportunity if the country may start to build the brand in its own way. Hence, building a position on new markets requires time, but the fact to be a brand-new destination can be the key asset to go faster and more efficiently in building awareness in tourists' perception. In such a dynamic context, the way out is detected in favoring tourism as a possibility to enhance national economy. The rapid expansion in the past few years, in terms of the number of tourists, caused tourism to be recognized as one of the national strategic priority areas in Macedonia. Significant marketing efforts have been made to introduce the country in the international competition playground.

Although this study may add to the current research on green tourism and hotel industry in Macedonia [13-16], its main contribution lies in the intention to provide insights into the processes and conflicts over efforts to brand Macedonia as an eco-friendly destination. Moreover, this research assesses how Macedonian hospitality industry stakeholders manage the environmental quality, which directly leads to increase destination's competitiveness. It has a practical significance since it discusses the level of environmental quality of Macedonia as a base for creating a national green tourism brand. The above-mentioned underlines that tourism branding in Macedonia cannot be conducted successfully without considering the context of "green" tourism.

After the introductory section, the followingnotes some references on green brand and some facts discussing how green Macedonia is. Section three includesthe methodological framework; section four provides the main findings and discussion, while the final section offers conclusions and recommendations.

2 BACKGROUND MATERIAL

The vagueness of environmentally sound behaviours reflects the loose definition of a green brand. Hoteliers have rearranged their priorities and tried to make the establishments green, due to the fact that environmentally-conscious and adequately informed tourists are more willing to pay than others [17], and rather consume green products and stay at green hotels [18]. Yet, tourists are willing to participate in energy reduction efforts if it does not greatly diminish their holiday experience, if it is easy, or if it saves them money [19]. Consequently, hotels urge to apply environmental protection programs for reducing the energy consumption, recycling and composting food scraps [20-22].

Generally, tourism accounts for about 5% of GHG emissions worldwide, out of which the largest proportion of 75% is associated with transportation, whereas 40% is caused by air traffic [23]. Another factor that contributes to the environmental footprint of tourism is accommodation. This sector represents approximately 20% of GHG emissions generated from tourism [19]. The variety of tourism types, which rely on clean nature and unpolluted environment as core values, impose the necessity to strive for sustainable

tourism. Consequently, the hotel management introduces such energy practices that enable environmental protection by reducing carbon dioxide, methane, nitrous oxide and other harmful emissions that provoke global-warming and climate changes. Yet, despite the gain in efficiency, the emissions from global tourism sector are predicted to grow 161% by 2035 [19]. This actually means that tourism implicates many negative effects that must be prevented or at least decreased.

Around 90% of the primary energy in Macedonia is produced from fossil fuels, mainly lignite and heavy crude oil. Moreover, the energy sector contributes with over 70% in total emission of GHG. As a result of these two factors, an enormous pollution of the environment is provoked. Based onthe State of Environment report [24], the total emissions by sectors in Macedonia are due to combustion processes (60%), transport (30-40%), and other (less than 5%). The share of recycled packaging is 12% of the total packaging placed on the market. The air quality notes an abundance of daily limit values of PM10 and PM2.5, which remains a challenge for the future. However, Macedonia continues to adopt and implement EU Acquis.

Being identified as the best way to achieve energy independence and simultaneously take care of introducing and maintaining sustainable development, the renewable energy sources (RES) are heavily promoted as the least pressure production on the environment. In 2015, the renewable energy share was 15.9% of the European energy mix, which is twice as much as it was in 2004 and almost onepercentmore than it was in 2014 [25]. While the EU countries are largely investing to increase that share, Macedonia is facing immense problems. Although the transition period passed years ago, Macedonia is still in its starting point when it comes to the development of alternative energy sources and the concept of sustainable development. As a country aspiring for the EU membership, Macedonia is obliged to transfer the legislation into its legal system, which consequently leads to the preparation of several strategic documents such as the Strategy for Energy Development in the Republic of Macedonia until 2030 [26], the Strategy for Utilization of Renewable Sources in the Republic of Macedonia by 2020 [27], and the Strategy for Energy Development in the Republic of Macedonia until 2035 (in Macedonian) [28].

Within the latest Strategy for Energy Development, it is foreseen anincrease competitiveness in the wider regional energy market and high energy efficiency [28]. The objectives proclaimed by the EU in the energy field until 2020 are as follows: improvement of energy efficiency by 20%, provision of energy from RES in the amount of 20% of the final energy consumption, and at least a 10% share of RES in the final energy consumption in traffic [26]. In this line, the maximization of the utilization of the RES is noted to be among the strategic priorities, which is proved by the constant increase from 4.2% in 2012 [29] to 13.8% in 2005 in the final energy consumption. Consequently, Macedonia belongs to the countries with a relatively high utilization of this type of energy [26]. Moreover, based on many scenarios within the strategic documents, it is indicated that Macedonia can target a share of RES set at 21% [27].

3 METHODOLOGY

The primary objective of the study is to determine the level of environmental quality of Macedonia as a base for creating a national green tourism brand. To achieve it, the study investigates the perception of hotel management in application of eco-policies and environmental practices by exploring standard indicators. Moreover, theassessment is made on how the hotel management copes with the environmental quality, which directly leads to an increase of the destination's competitiveness.

The study usesquantitative and qualitative

methods. The quantitative method consistsof an online survey among 127 managers and department supervisors of three, four and five-star hotels in Macedonia, conducted in May 2015. It was based on 32 indicators already discussed in [30]. The questionnaire was structured in three sections (Environmental policy; Usage and savings of resources; and Benefits and constraints) with two-choice questions and a five-point Likert scale. The low response rate of 35.4% was expected due to the lack of personal contact when conducting an online survey. By applying the Categorical Principal Components Analysis (CATPCA) technique, the number of variables was reduced, while the reliability of the components was checked by the Cronbach Alpha. The scores of the perception components were compared by Kruskal-Wallis tests, while the indicators for benefits and constraints were perceived by calculating medians in the components scores.

A consultation of secondary sources was conducted in the qualitative method. It included a review of literature and websites, thus adopting a multidisciplinary approach. Information collected via these procedures enabled triangulation and validation of the data.

4 FINDINGS AND DISCUSSION

As noted, the questionnaire was structured in three sections. Section I comprised of 12 questions defining the environment policy (α=0.81; average score of the mode = 3 i.e. medium level of influence). There is a variety of available tools that can be used to implement efficient environmental policy and environmental management system (EMS). Among the investigated, the top three items perceived by the managers are: Prevention interventions (0.834); Employees' training (0.718); and medium knowledge of the environmental protection standard ISO 14000 (0.664). There are also over a hundred global and regional certification programs for sustainable tourism (e. g. Green Globe, Green Key, TourCert, Travelife) which support hotel management in the establishment of appropriate EMS through the use of labels (Font, 2002). Therefore, Ecolabels and Eco certificates are widespread tools for policy and marketing tourism strategies and are frequently used to show quests' reliability. Additionally, they may add credibility to green brands, but are unlikely to actively communicate the array of functional and emotional benefits consumers, other than the greenest, seek. In the case of Macedonia, 60.9% of the surveyed hotels do not have Ecolabels and 64.6% do not hold an Eco certificate. This is opposite to some facts that certification programs provide benefits and impose more efficient operations [31]. It was also found that Macedonian hotel management rarely prepares written plans for environmental protection which is not in favor of supporting the European environmental impact assessment regulation. This legislation started to develop in the 1970s and since then, many documents, action plans and standards have been established by the European Union. Besides industry, energy, transportation and agricultural sections, tourism is also introduced as a segment that must conform to the Fifth Environmental Action Program. Due to the fact that Macedonia is a candidate country for EU membership, much attention should be put so that hospitality industry stakeholders meet the internationally set standards.

Section II includes11 questions for assessing the usage and savings of resources (α=0.74; average score of the mode = 4 i.e. strong level of influence). Environmental management may serve as an effective strategy for hotels and destinations to create additional value in the long run. This was found not to be the case with Macedonia. The findings are alarming since they point to extremely limited use of alternative energy sources and new innovative approaches in saving energy consumption. The findingsfor the items referring to geothermal energy, biofuel, photocell lighting, "smart rooms", dimming system and the use of

treated water, are far below the critical values. Hence, Macedonian hotel management lacks EMS, which reduces resource use which cuts down operational costs, becoming increasingly important especially when considering the ever-increasing resource prices (e.g. energy prices) or local shortages of resources (e.g. water). On the other hand, the awareness of quests is constantly rising. Namely, the signs in hotel bathrooms that encourage guests to use their towels more than once to contribute to saving the environment are part of Macedonian hotels' policy. This is known as one of the oldest environmental protection strategies in tourism, initiated for about thirty years now. By saving money due to less dirty laundry to wash, it may contribute to environmental protection.

Section III covered 10 questions in the line of measuring the managerial perception on the benefits and constraints for applying the energy consumption concept (α=0.63; average score of the mode = 4 i.e. strong level of influence). As per benefits, the top three items perceived by the managers are: Environmental protection (0.642); Improved image (0.612), and Enhanced competitiveness (0.514). They are assessed as strong determinants for introducing and sustaining energy efficiency practices. The summarized results confirm the findings as in [32-34], that although being aware of the importance of the energy consumption and environmental protection, its stewardship is not a top priority. Namely, the problem is the gap between the environmental awareness and the daily practice of the hotel management.

As per constraints, the top three items being perceived as determinants with medium influence are: Lack of subsidies (0.567); Cost increase (0.511); and Technical limits (0.447). This supports the market postulate for minimizing the costs and maximizing the profit so that the hotel can survive. The blame is put on the restricted financial resources and high operation costs for the limited application of RES. Due to the economic and socio-political problems, the hotel management is often faced with existential difficulties. Hence, the environmental issues have just recently come to attention. This is very different when compared to the Scandinavian countries where the environmental protection is of high importance and has long received political and financial support at local and national level.

When calculating the nonparametric correlations between hotel types and managerial perception scores (in terms of the components resulting from the CATPCA), we found:

Presence of positive correlation between hotel type and managerial perception; and

Positive and significant correlation between five-star hotels and the environmental practices.

5 CONCLUSION AND RECOMMENDATIONS

Contemporary tourists expect an environmentally responsible hotel management to meet their environmental needs and expectations. This provokes a profound modification in the hotel industry which has steadily recognized the necessity for becoming greener in order to be well positioned on the competitive tourism market. Consequently, hotels (as leading accommodation facilities) are rapidly becoming environmentally responsible. By developing the idea of having eco-hotels, a "green" brand may be initiated which may position the country positively to be differentiated from competitors in a way that authentically resonates across stakeholders.

This research found that the improved image along with the enhanced competitiveness are strong determinants, provoking better interest than the increase of number of guests. Yet, alarge number of surveyed hotel managers lacks measures to reduce the conventional energy use and replace it with RES. Although being fully aware of the importance of the environmental concept, this is not the managerial priority of Macedonian

hotels.

Based on the survey findings, we may conclude that Macedonian hotel management possesses relatively low level of environmental quality, resulting in poor and insufficient base for initiating the creation of a national green tourism brand. Therefore, some recommendations may be followed and allow the creation ofmore pro-environmental marketing strategies to enhance the country's distinctiveness. The hotel management must take steps to become more environmentally sustainable, even if there are initially costs for the implementation of the changes (technological, behavioral and organizational) in their everyday business, which will lead to cutting the operating costs and resulting in constant improvement of the efficiency. This should be done even if tourists do not demand it as part of their expectations. Additionally, Macedonia can imposefrequent penalizationof the environmentally unsound concepts practiced in hotels. In the same line, in order to meet tourism sustainable development goals, the hotel management must find a way to avoid the fragmentation driven by the competitiveness, and work along in order to shape policies, not just react to them. This fully fits with the findings of [35-36] which state that the emerging destinations are by far challenged to achieve competitive advantage.

In the line of assisting Macedonia to be a step closer to be identified as "green", some initial actions are recommended. For example: To set targets and benchmarking, as well as to apply for eco certification; To motivate tourism employees, tourists and all other stakeholders in tourism development, through awareness-raising and through incentives for energy reduction;

To support engagement of architects and urbanists in the process of planning, designing and refurbishment of energy efficient architecture;To install energy-efficient devices;To use alternative fuels (e.g., biodiesel) and RES (e.g., wind, photovoltaic, solar, thermal, geothermal, biomass and waste); To integrate emission management (including supply chain management) and wider environmental management (e.g., waste); To develop an environmental 'Code of ethics', (checklist or criteria that a hotel can provide to its suppliers to help them perform their services to the sector in an environmentally respectful manner;To include energy-efficiency and renewable energy use support programmes in national tourism policies and development plans (Agenda 21, guidelines, regulations, incentives, planning, capacity building, stakeholder cooperation) etc.

The capacity and capability of introducing RES may become an important criterion for the level of the sustainable development of Macedonia, thus contributing to its national green branding. It does not mean just having an attractive logo and a tag line. It means much more and serves for a deeper purpose - to position the country so that it can achieve maximum success in the world system. This requires government actions for unprecedented political commitment and effective policy design and implementation. Only the government knows the full agenda of the country and has the power and resources to lead the country in a branding process. That is the only way Macedonia may establish and maintain competitive and sustainable development if it aspires to be based on tourism. By initiating the "green electricity" production, it may be a step closer to creating preconditions for green tourism development as well. Instead of having tourism and hospitality facilities that are highly dependent on fossil fuels, the inclusion of the renewable energy for energy production may allow improved and protected environment being detected as one of the preconditions for developing green tourism.

The study results are subject to several limitations, so further improvements may be undertaken on theoretical and practical level.

First, the assessment is based on a relatively

small sample of hotels, which may put a doubt on the representation of the findings for the country in general. The investigation may employ multiple models and theories related to the green branding;

Secondly, it applied a relatively small set of indicators to trace how "green" Macedonian hotels are. Additional examinations may be done by introducing more criteria for assessing the application of energy policies and environmental programs;

Thirdly, the selected respondents represent just one interest group, so improvements may include other aspects (e.g. hotel's employees, hotel's guests, etc.). By combining and comparing responses, a more comprehensive overview may be accomplished.

Yet, the study may assist in better understanding of the possibilities for branding Macedonia as a destination that provides green tourism, upon which specific communication strategies may be set. Overall, the research generates useful findings and points to valuable directions for further work in the field of tourism branding.

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AN ECONOMIC OVERVIEW OF THE WESTERN BALKANS: CONVERGENCE WITH THE EU

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ABSTRACT:This paper aims to present policy recommendations to local and EU authorities about enhancing EU enlargement towards the Western Balkans based on a brief economic overview of the Western Balkans convergence with the EU looking from the perspective of macroeconomic performance, structural reforms and regional integration. The evidence shows that there has been an economic convergence of the Western Balkans with the EU, while in the recent years it has slowed down and is it has been slower than the New Member States, especially after the global economic crisis. The macroeconomic performance of the Western Balkan countries showed fiscal and macroeconomic stability, while the economic growth has been moderate, which assumes the first policy recommendation - to faster economic growth in order to catch-up with the EU level. Further, the empirical analysis suggests that structural reforms have positive impact on economic growth, which implied the second policy recommendation- to enhance structural reforms. Finally, the evidence shows that the EU membership has played significant positive impact on the convergence for New Member States, which indicates for the endogeneity of EU integration process, thus we may suggest the third policy recommendation- that EU can play a role in enhancing credible structural reforms and further convergence of the Western Balkans with the EU. Hence, we consider that 'New approach' and new initiatives of support from the EU will accelerate the reforms and catching-up of the Western Balkans with the EU.

Keywords: Integration, economic convergence, structural reforms

1 INTRODUCTION

The EU integration has been an important process of economic, political and social transformation of the Western Balkans and its convergence with the European Union. In the last 25 years the evidence of the Western Balkans and the Central and Eastern Europe shows that there has been a convergence with the EU average level of the living standard during the transition period of the 1990s and later through the EU integration process. However, there is still a gap compared to the EU living standard, and the economies of the Western Balkans need to grow faster in order to catch-up the EU level. In the recent years the convergence has slowed down, while after the economic crisis the catching-up is slower in the Western Balkan compared to the New Member States (Fig. 1).

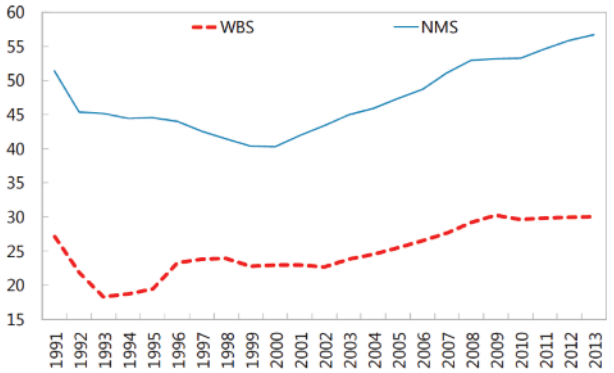

Fig. 1. Catching-up with EU: GDP per capita as percent of average EU17 (Source: IMF, 2015b)

The challenge is how to accelerate the EU integration process and economic convergence of the Western Balkans with the European Union. This assumes structural reforms to enhance the competitiveness of their economies. However, as stated by IMF (2015b) "the process of structural transformation began to stall in the mid-2000s, in the face of vested interests and as reform fatigue set in and remains incomplete." In addition, as the EU enlargement process is taking longer, Stanfey et al. (2016) argues that "...long-term challenges remain, such as the possibility of a slowdown in reforms...".

Namely, enhanced structural reforms accompanied with a macroeconomic stability and promotion of regional cooperation will be the challenge of the forthcoming period of economic integration with the EU. Accordingly, in the following analysis we present an overview of developments and initiatives of policymakers on these three aspects relevant to convergence: macroeconomic performance; structural reforms; and regional economic integration.

2 MACROECONOMIC PERFORMANCE

The Western Balkans during the 1990s initially worked to achieve macroeconomic stability in terms of inflation and exchange rates, fiscal consolidation and international liquidity, as well as reforms towards market economy reforms (IMF, 2014). The next decade was more optimistic with capital inflow and higher economic growth average above 5% real GDP growth (IMF, 2015b) lasting until the global economic crisis of 2008-2009, thus slowing down the pace of economic growth. These developments further affected the economic convergence of the Western Balkans with the EU and reiterated the importance of sustaining macroeconomic stability and promoting faster economic growth. As we can see in Table 1, the Western Balkans continues to keep fiscal balance in terms of budget deficits below 2% and public debt below 60% of GDP, while projected an increase of real GDP growth (from 2.5% in 2013 to 3.6% in 2019) and improvements in trade balance (reducing trade deficit from 16.3% in 2013 to 13.3% of GDP in 2017 and projected 12.1% for 2019).

Table I. Macroeconomic performance

Western Balkans	2013	2014	2015	2016	2017	2018	2019
Real GDP growth (%)	2.5	0.3	2.2	2.9	2.6	3.3	3.6
Consumer price inflation (%, period average)	0.8	0.2	0.5	0.9	1.8	2.1	2.0
Fiscal balance (% of GDP)	-4.0	-4.1	-3.3	-1.4	-2.0	-1.5	-0.9
Public debt (% of GDP)	42.4	46.8	49.2	48.6	48.4	48.4	46.9
Public and publicly guaranteed debt (% of GDP)	47.4	51.5	54.0	53.3	53.2	52.9	51.7
Trade balance (% of GDP)	-16.3	-16.7	-15.1	-13.3	-13.3	-12.7	-12.1
Current account balance (% of GDP)	-6.3	-7.0	-6.1	-5.5	-6.1	-5.9	-6.0
External debt (% of GDP)	77.2	81.9	82.4	82.7	83.6	83.5	82.6
Unemployment (%, period average)	24.2	24.3	23.2	20.8	n.a.	n.a.	n.a.

Source: World Bank calculations, World Economic Outlook 2017.
Note: 2017 forecast, 2018 and 2019 estimation.

Next, looking from the perspective of SEE 2020 strategy, as presented in Table 2, we can notice that countries from the region move slowly in terms of convergence with respect to real GDP per capita, namely achievingthe average of 34% in 2015 of EU average GDP per capita, which is only 17% progress from the baseline of 32% in 2010, while the target for 2020 is 40% of EU average GDP per capita. A similar situation is when considering other indicators which alarm for the importance of enhanced structural reforms and increased regional trade integration (intra-regional trade has reduced for 15% compared the progress from baseline to the target).

Table II. SEE 2020 targets and results

Progress towards SEE 2020 Regional Headline Targets									
SEE 2020 Headline Indicator	2010 (baseline)	2011	2012	2013	2014	2015	2016	2020 (target)	Progress from baseline towards target
Overall Strategic Goals									
1. GDP per capita relative to the EU average (in PPS), %	32	33	33	34	33	34	n/a	40	17%
2. Total trade in goods and services (EUR million)	54.686	62.972	63.638	67.032	69.965	73.004	78.261	129.500	32%
3. Trade balance, trade in goods (% of GDP)*	-22,1	-23,3	-23,7	-19,5	-20,5	-19,6	n/a	-20,8	192%
Integrated Growth									
4. Intra-regional trade in goods (% of GDP)*	10,6	11,0	10,5	10,1	10,2	10,1	n/a	14,3	-15%
5. Overall FDI inflows (EUR million)	3.587	5.879	3.023	3.689	3.614	4.517	4.578	7.300	27%
Smart Growth									
6. GDP per person employed (EUR)	26.567	28.917	29.369	29.685	28.960	n/a	n/a	36.300	24%
7. No of highly qualified persons in the workforce (mil	1,09	1,14	1,27	1,36	1,47	1,55	1,61	1,44	146%
Sustainable Growth									
8. Net enterprise creation (no. of companies)	29.039	30.927	30.579	34.416	31.908	32.022	26.872	26.790	n/a
9. Share of Renewables in Gross Final Energy Consum	27,1	20,2	21,7	25,9	30,0	24,0	n/a	31,2	71%
Inclusive Growth									
10. Employment rate - age group 20-64, %*	4866,0%	4760,0%	4700,0%	4776,7%	4878,3%	4935,0%	5135,0%	5480%	57%
Governance for Growth									
11. Government's effectiveness, WGI (scale 0-5)	2,21	2,24	2,30	2,30	2,44	2,41	n/a	2,65	52%

3 STRUCTURAL REFORMS

There is a growing literature on the impact of structural factors on convergence, though mostly on larger panels of countries. IMF (2015b) found positive relationship of structural reforms with productivity and convergence, while in the following literature review (Acemoglu et al., 2005; Aghion, Howitt, and Mayer-Foulkes 2005; Campos and Coricelli 2002; Che and Spilimbergo 2012; Ciccone and Papaioannou 2009; Dabla-Norris et al. 2016; IMF 2015a; and Fung 2009) they summarize that reform priorities for sustaining convergence have been found to vary with income levels.

The results indicate that the productivity dividends depend on where a country is in the development process, highlighting the need for calibrating reforms to the stage of economic development. As economies and the financial structures develop and become more sophisticated, reform payoffs and priorities shift. Looking over longer horizons, our empirical analysis finds that the productivity payoffs vary across reforms and over time. The results also suggest that the benefits of reform tend to become more pronounced when reforms are bundled together. Moreover, the experiences from different countries hint at potential lessons for effective reforms, including the importance of strong ownership, the ability to sustain reforms, and the need for complementary macroeconomic and structural policies. Namely, policy reforms may have nonlinear effects that can be contingent on the quality of political and economic institutions.

Open issues in the literature related to the EU enlargement of the Western Balkans remain: catching-up with the EU living standard and deepening the structural reforms. Namely, Sanfey et al. (2016) states that "The key issue is whether the Western Balkans countries can narrow the gap in the coming decade and, if so, what do they need to do to achieve this." Similar, conclusion is made by IMF (2015b) "What, then, needs to be done? Preserving macroeconomic stability is paramount for durable growth... Embarking a new on deep structural reform is a key policy priority for the region." It is also stated clearly by European Commission (2015) in 'EU Enlargement Strategy': "Enlargement needs to be understood as a process which supports reform and the fundamental changes needed to meet the obligations of EU membership... Enlargement can only be of benefit to the EU and to partner countries if there is genuine, sustainable reform. Through this process countries will become fully ready to join the EU and be able to reap the benefits and assume the obligations that arise from membership."

Following the above empirical investigations, we continue with regression analysis of the impact of structural reforms on convergence for the Western Balkans and New Member States for the period 1996-2014 (Besimi, 2017). The results suggest the following three findings: Convergence is persistent and stable long-term process; Structural reforms have positive impact on convergence; and EU membership enhances convergence. Convergence is persistent process with significant impact of lags from the first three years. It is a stabile process in cumulative with two-year lags, although the first lag has a coefficient larger than 1, the second lag is negative impact, thus stabilizing the cumulative impact. Structural reforms' impact on convergence is positive and statistically significant in most reform indicators. The impact of reforms on convergence becomes significant when introducing more convergence lags to control theautocorrelation effect. This assumes that the impact of reforms is in long run due to the persistence effect. The positive impact of EU membership on convergence, namely after becoming EU member and countries performing better with the convergence, indicates the endogeneity of EU integration process, which will also have policy implication in addressing the role that EU can play in enhancing structural reforms and EU integration of the Western Balkans.

REGIONAL INTEGRATION

To highlight the importance of economic integration and to recall the current economic situation of the Western Balkans, we should consider some relevant economic indicators as follows: [1] Gross domestic product per capita reaches 35% of the EU average and the dynamics of economic convergence has slowed down in the years following the global crisis of 2007-2009. [2] Real GDP growth in the Western Balkans in 2016 is estimated at about 2.8%, while in the EU is around 1.9%. Unemployment in the same year is estimated at about 20% in the Western Balkans, while in the EU it is 8-9%. [3] Macroeconomic stability has been preserved, but in the post-crisis years it has been challenged by increased budget deficits and the public debts of the countries of the region. At the regional level the average budget deficit in post-crisis years was up to 4% compared to 1% of GDP in the pre-crisis period, while the public debt also increased from 35% to about 50% of GDP. [4] The countries in the region are mainly with low competitiveness in the global market, with average export reaching around 40% of GDP in the world market, while about 60-70% of total exports are realized in the European market and around 10% among countries in the Western Balkans. The region continues to show external

account deficit at about 10-12% of GDP, which also reflects the low level of productivity compared to EU countries (the trade deficit is even higher if we consider that foreign direct investment accounts for about 5% of GDP in 2016). [5] Structural reforms are stagnating in recent years, which is interlinked with the slowEuropean integration process in the Western Balkans after the global economic crisis and the rise of euro-skepticism in some EU countries, as well as the rise of populism and nationalism in the countries of the region.

Apart of the above-mentioned list of economic challenges, the challenges of the political and the geostrategic relevance are undoubtedly listed as well, such as: [1] Preserving security and peace in the region; [2] Democratization of societies and preservation of political stability; [3] Interethnic reconciliation and respect for cultural diversity; [4] Solving open disputes and good neighborhood relations; and [5] Euro-Atlantic integration and global geostrategic developments (since the awaken Eastern interest for the region).

In the wake of the Berlin Process, the Fourth Summit for the Western Balkans was held on 12 July in Trieste, where the Regional Economic Zone of the Western Balkans was also promoted and this was the reason why last weekend I analyzed some documents and economic statistics for the region. I found some issues to be underlined: [1] The Regional Economic Areaof the Western Balkans is an initiative of the countries from the region which enjoys full support of the European Commission. [2] This initiative should not be taken as a substitute for the European integration of the region, but contrary, it should accelerate this process. [3] The purpose of this initiative is to make the region more attractive for investments, both domestic and foreign direct investments, by presenting a market of about 20 million people, which is further supposed to accelerate economic growth and createnew jobs. [4] The dynamics of implementation will depend on the countries of the region, and a multi-annual action plan adopted that foresees activities for the period 2017-2020 (with some activities going on until 2023). [5] The Regional Economic Area includes four dimensions: trade, investment, mobility and digital dimension.The advancement of CEFTA protocols will be conductedin terms of advancing the free trade of goods and services. In the context of attracting investments, a common regional agenda will be approved. The free movement of professionals, students, scientists and academics will be affirmed. Meanwhile, digitization will include roaming, internet, cyber security and data protection. [6] Regional co-operation will be advanced through the European Commission's 'Connectivity Agenda' for the Western Balkans for the modernization of transport and energy infrastructure. [7] The Chambers of Commerce of the countries of the region established the Joint Secretariat which should help the Regional Economic Area be a concrete opportunity for regional business.

Additional evidence of an increased focus to EU enlargement towards the Western Balkans is consisted in the EU Roadmap: 'Initiatives to be launched with a 2025 perspective: ...Strategy for a successful EU accession of Serbia and Montenegro as frontrunner candidates in the Western Balkans, with a particular emphasis on the rule of law, fundamental rights and the fight against corruption and on the overall stability of the region.' (Roadmapfor a More United, Stronger and More Democratic Union, State of the Union 2017, Letter of Intent, European Commission, 13 September 2017)

5 CONCLUSIONS

Following the literature review and our empirical analysis, we may conclude with the following three policy remarks.First, the convergence is a persistent process, while the cumulative impact of autocorrelation is positive and stable, there is negative autocorrelation coefficient of the second lag which may be interpreted as a reflection of the fractional negative impact of structural reforms on convergence due to the distribution effect and vested rents of certain interest groups in the society. Secondly, structural reforms have positive impact on convergence as a long-term process, while the impact varies across reforms and over time and their impact is also non-linear dependent on the quality of political and economic institutions. Finally, the evidence shows that the EU membership has played significant positive impact on the convergence for New Member States, which indicates for the endogeneity of EU integration process, thus we may suggest that EU can play a role in enhancing credible structural reforms and further convergence of the Western Balkans with the EU. Hence, we consider that 'New approach' and new initiatives for support from the EU will

accelerate the reforms, catching-up of the Western Balkans with the EU.

The raise of Brussels' and other EU capitals' attention on the Western Balkans is a good signal for the EU enlargement process enriched with new initiatives such as the Western Balkans Six, Connectivity Agenda, Berlin Process, Brdo-Brijuni Process, Berlin Plus and others. In the last years, the long-standing process of EU enlargement for the Western Balkans and the raised Euroscepticism within the EU members and populism in the candidate countries states affected the credibility of this process which requires strong support from the EU and serious commitment from candidate countries to get back on faster track the Western Balkans on EU integration.

Given the above-mentioned challenges, the Regional Economic Area and European Integration of the Western Balkans should ensure convergence (catching-up) with the living standard and quality of life to that of the EU countries. Viewed in macroeconomic terms, this will be achieved by: [1] Faster and inclusive economic growth; [2] Raising the competitiveness of the regional economy; [3] Increased domestic and foreign direct investment; and [4] Improvement of the external balance, namely the reduction of trade and balance of payments deficit.

As we said above, it turns out that the success of the economic integration will directly depend on: [1] Political will and commitment of the countries of the region. (It should be a 'win-win game' and there should be mutual solidarity between the Western Balkan countries) [2] European Union's political and financial support. (This will also increase the interest of regional cooperation.) [3] Progress in Euro-Atlantic Integration. (This will increase the credibility of regional integration initiatives).

In conclusion, we may say that the Euro-Atlantic perspective and regional cooperation are a guarantee of peace and prosperity in the Western Balkans.

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HEAVY METAL POLLUTION OF BATLLAVA LAKE FROM DRAZHNJA AREA (Kosovo)

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Abstract: Because of the lack of wastewater treatment plants, all Kosovo lakes are exposed to high level of pollution from urban wastewater, as well as from industrial pollution. Batllava Lake drains waters of northern and southern slopes of Drazhnjamountains. The hilly area divides Kosovo Valley with Drazhnja area. The average flow of Batllava Lake from Hertica River is 0.25 m3/s.From ascientific point of view, the objective of this research was the determination of heavy metal concentrations in the water of Batllava Lake. Heavy metal pollution may cause serious consequences for living organisms in the flow of the rivers, flora and fauna and the population living along the river. The research included measurement of heavy metals concentration: Iron (Fe), Nickel (Ni), Lead (Pb), Manganese (Mn), Zinc (Zn) and Copper (Cu). Samples were taken in 6 sampling sites from surface water and 3 underground waterlocations, andwere analyzed in the laboratories of the ALS Chemex in Romania and Kosovo institute – InkosSh.A.Other physical and chemical parameters were measured as well. Atomic Absorption spectrometry was the methodology used to determine the concentration of heavy metals.The results of the measurements showed that the water quality of the Batllava Lake is of a poor quality, primarily due to the human activity impacts, such as wastewaters discharged into the lake, urban pollution, industrial and agriculture pollution.

Keywords:Water, river, heavy metals, analysis.

1 INTRODUCTION

Kosovo is limited in both ground and surface water resources, therefore protection and rational use of water resources is vital for the economic development of the country (Fig. 1). Due to the geographical position of Kosovo, Kosovo rivers have very short length (Ibri, Lepenci, Lumëbardhi-iPrizrenit, and Morava e Binqes) and quickly reach out of Kosovo territory. Kosovo Rivers are seasonal rivers, mainly depending on rainfalls, therefore during the summer time, where the water use demand is increased, theflow is minimal. In an average humidity year, the flow of

Kosovo's rivers is 3.6 x 109 m^3, respectively 121.2 m^3 / s, while the total accumulated volume in existing accumulations is 569.690.000 m^3, which represents only 15.7% of the total water amount. Based on the above-mentioned data on water reserves, population density and birth rate, they lead to the conclusion that water resources will be still limited, and when we add to this the uncontrolled urban development, the situation will be exacerbated even more in the future. Continued growth of demand for water, food and energy, ongoing waste depositions in the rivers and expected climate change impacts show for the need for a more appropriate approach to this limited resource.

Fig. 1.The map of Kosovo

2 METHODOLOGY

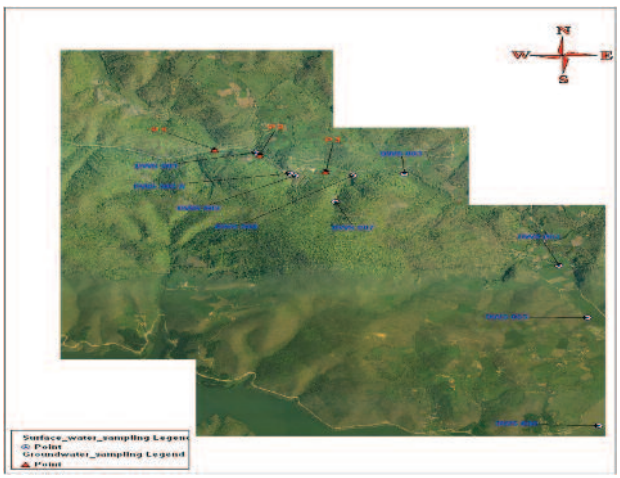
Water quality monitoring in Batllava Lake is conducted in 6 locations of surface water monitoring and 3 underground points for underground water monitoring. The following parameters were monitored: Fe, Ni, Pb, Mn, Zn, and Cu. Water quality monitoring in Batllava Lake, was monitored for 1-year period which was conducted every month. During this research work, the sampling and laboratory analyses, comparing the results, data storage and data processing were the main aspects in determining the parameters in the Batllava Lake water. In addition, we used:

GPS-Garmin. (Determination of location coordinates)
Atomic Absorption Spectrometry (AAS). Prekin Elmer Analysis 4000

Samples were analyzed in the "ALS Chemex in Romania and Kosovo Institute – InkosSh.A."

3 RESULTS

Considering the qualitative and quantitative content of the matter changes from one site to another, the determination of the sampling site is important from chemical point of view. Water samples from Drazhnja River to Batllava Lake were taken during different periods. The above described monitoring sites (points) are presented in the maps (Fig. 2 and 3).
During our research, the following parameters were analyzed for: Fe, Ni, Pb, Mn, Zn, and Cu.
*"P1, P2, P3" = Underground water monitoring,



"DSW 001, DSW 002, DSW 002A, DSW 003, DSW 004, DSW 005 and DSW 006" = surface Sampling Sites

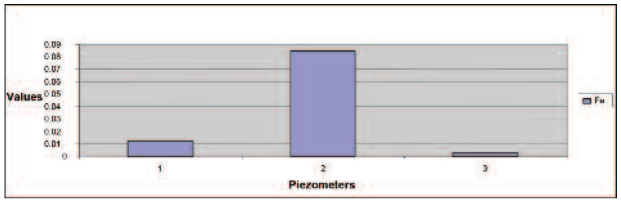
Fig. 2.Sampling sites in Drazhnja River to Batllava Lake

Fig. 3.Underground samples monitoring - (P1, P2,

P3)

Theunderground water monitoring of the underground points was conducted in same time with surface points duringall periods and same metals concentration.

Iron (Fe) is important metal for the life of plants and animals. Presence of iron compounds Fe in drinking water, in concentration up to 0.08 mg/L is not harmful for the health. In soluble form, Fe is two-valent iron (oxidation state +2), while in the presence of oxygen it is perceived as iron hydroxide of red/brown color which is insoluble. It is inconvenient for households and industry. In waters rich in iron, (Fe) is found in bacteria known as "filamentous" that grow and multiply. It negatively affects the quality of water, because in this case it comes to the collection of biomass in the distribution system. Iron (Fe) is an essential metal in the structure of hemoglobin and is used as therapy in anemia, which is caused by lack of iron (Fe) in the blood. In high doses it is toxic. The amount of iron in the water results from corrosion of pipes and discharge of industrial waste water containing iron. Iron is in the form of Ferro ions (Fe^{2+}) and Ferry (Fe^{3+}), presented in Fig. 4. Iron compounds are mainly of inorganic nature, or iron bound to organic compounds.



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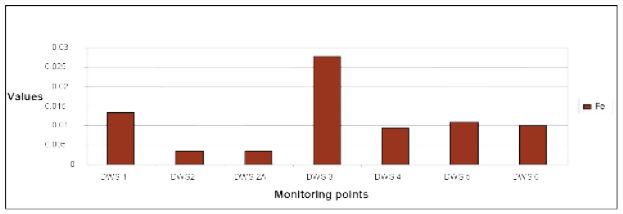

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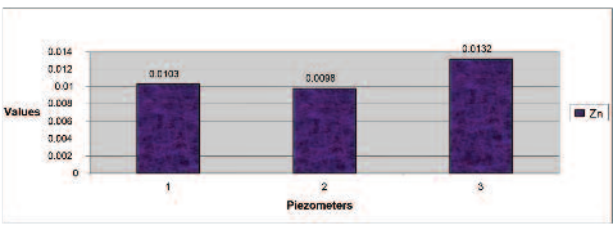
Fig. 4.Graphical presentation of Fe concentration by AAS, [mg/L]

Nickel (Ni) is white metal of the same color as silver, a riveting metal most widely used to acquire metal alloys and coatings due to resistance to oxidation. Nickel is less toxic, except nickel carbonyl which if inhaled into the lungs can lead to death due to lung damage. Chronic exposure to nickel causes cancer to respiratory organs and lungs. Normal values of nickel concentrations in water are below 20μg/L, although concentrations of hundreds of μg/L are found in groundwater and drinking water. The concentration of nickel in drinking water may increase due to the use of pipes that contain the chromium-nickel alloy. In some cases, concentrations up to 10 μg/L have been detected, such as in cases of water flow from situations when the water remained unused for a long while. During our research on Batllava Lake, we have not registered any nickel concentration.

Manganese (Mn) occurs naturally in the form of oxides, silicates carbonates etc. It is an essential element. It can enter in the structure of enzymes and adversely affect their physiological function. It protects biological cells from the harmful effects of free radicals. Values under physiological quantities adversely affect the formation of teeth and bones. On the contrary, increased values of manganese adversely affect the respiratory, cardiovascular, hematology, immunology and neurological systems. Surface and underground waters contain up to 0.08 mg/l. During our research on Batllava Lake, we have not registered any manganese concentration.

Zinc (Zn) isfound in same quantities in underground waters, so the industrial discharge waters contain middle concentrations of it (Fig. 5). It is an essential and indispensable element for 160 enzymes. Daily needs for zinc (Zn) are 2-15mg. Below these values, the body reacts by physical fatigue, depression, anemia, loss of appetite, stomach dysfunctions, and reduction of potency and slow healing of wounds. During our research on Batllava Lake, we have not registered any zinc concentration.



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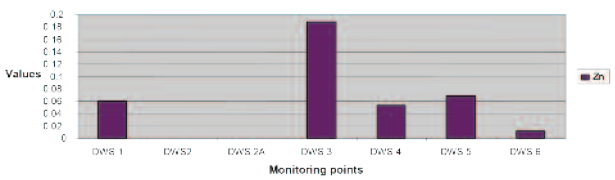

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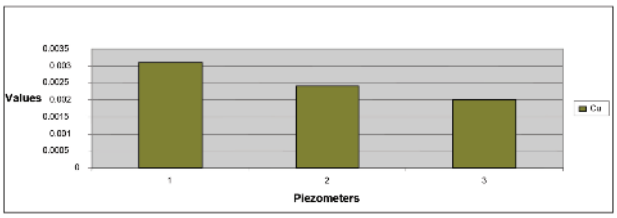
Fig. 5.Graphical presentation of Zn concentration by AAS, [mg/L]

Lead (Pb)as an element in the form of salts, has toxic effects acting as strong inhibitor for various biochemical reactions. Ithas harmful effects in blood enzymes, respiratory system, cardiovascular and cellular system. Long lead exposure causes death. In drinking water, the allowed quantity is 10 μg/dm^3. High concentration of lead causes death. During our research on Batllava Lake, we have not registered any lead concentration.

Copper (Cu). Copper is an important chemical element for human life and other living organisms as it plays an important role in metabolic processes, affecting a number of enzymes and synthesis of hemoglobin. It is received by food, and daily needs are 2-5mg. In high doses, it is toxic and may cause death. It affects especially children, causing liver disease. It irritates the respiratory system and causes disease in the thorax, decreases hemoglobin and red blood cells in the blood and hinders the healing of wounds. During our research (Fig. 6) in Batllava Lake (Fig. 7), no copper concentrations were registered.



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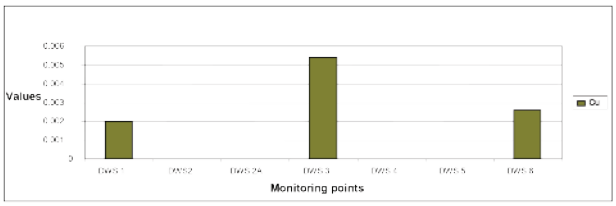

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Fig. 6.Graphical presentation of Cu concentration by AAS, [mg/L]

Surface samples monitoring - DSW 001, DSW 002, DSW 002A, DSW 003, DSW 004, DSW 005, DSW 006

Fig. 7.Batllava Lake

Regarding Drazhnja River (Hertica), from a chemical point of view, based on obtained results from the sampling and analyzes, it is noticed that there is an excessof the limit values of zinc (Zn) in sample DWS 3 (Fig. 5b).

4 CHEMICAL AND TOXICOLOGICAL EFFECTS OF HEAVY METALS

For physiological and biological development of the living world, essential elements are needed, which are taken through the food. It is well known the early Paracelsius's definition (1493-1541): "The dose makes the poison - The toxicity of any particular chemical depends on many factors, including the extent to which it enters an individual's body."For many substances, the toxic effect depends on their dose, so in cases of consumption of substances above the necessary requirements, the essential elements can be very harmful to health, andalso deadly. Also, consumption of essential elements below daily demand causes illness, and death. Toxicology deals with this issue. The total composition of metals in any type of water is the result of their input from many sources, i.e.: matrix substrate, atmospheric precipitation, fertilizers, and agricultural preparations, organic and inorganic pollutants. Additional details of chemical and toxicological effects of some elements, in natural and drinking water are provided below.

5 CONCLUSIONS

The general state of theBatllavaLake water in all its aspects and dimensions is unsatisfactory. During the field work, we noticed that all wastewaters from settlements that are located around the river are discharged without prior treatment. Another concern is the presence of solid waste resulting from households and construction. Solid waste in the rivers not only that affect water quality, but also contribute to the flooding, because the waste blocks the river flow. In particular, this happens

during raining seasons, after the flood, solid waste is spread around the river bed, agriculture lands get damaged, and there are other negative effects arising from the waste near or in the lakes.

Regarding the river and lake water quality, from a chemical point of view, based on obtained results from the sampling and analyzes in the first period, it is noticed that there is an excessof the limit values of zinc (Zn) in sample DWS 3. Whereas, results for other parameters such as Fe, Pb, Mn, and Cu, show no exceedance of limit values.

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OCCUPATIONAL SAFETY AND HEALTH AT WORK AS A PART OF SUSTAINABLE DEVELOPMENT AGENDA

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ABSTRACT: This paper examines the available data concerning non-fatal and fatal accidents at work in the Republic of Macedonia and the role that occupational safety and health plays in the sustainable development agenda of the country.

The main statistical indicators obtained from the European Statistics on Accidents at Work as well as annual reports of Macedonian Occupational Safety and Health Association for the period 2010-2016, were analyzed. According to the National classification of activities, 'Public administration, Police and Defense', 'Households as employers by their own needs and agriculture activities' and 'the Construction sector', they are counted as the riskiest occupational sectors. Disappointing is the fact that out of a total of 898 accidents at work and injuries that havehappened in the past period in all sectors together, 261 or 29.06% were fatal. Most accidents in this period (293 out of 898), had happened in the sector of 'Public administration, Police and Defense' out of which 18 or 6.14% were fatal, but the greatest number of accidents with fatal outcome, even 92 out of a total of 152 or 60.53%, were in the sector of 'Households as employers by their own needs and agriculture activities'.

Today, the changing nature of the world, corporate structures, marketing strategies and modern production processes, pose more Occupational Safety and Health (OSH) issues. Whereas previous sustainable development concepts have concentrated strictly on the environment and green technology, now, the costs of occupational safety and health diseases and hazards must be considered. Social and economic benefits of better health and safety at work have to be the main objectives of stronger national strategy in a good OSH management that will lead to benefit from many practices like reducing healthcare costs, sickness absence, and improving working methods and technologies.

Keywords: Accidents at work; occupational safety and health; sustainable development.

1 INTRODUCTION

Sustainability is a topic that continues to gain the attention of safety, health, and environmental professionals. Sustainable growth strives to balance social, economic, and ecological issues [1]. Taking into account that sustainability has a strong focus on energy, materials and other things that might fall under the umbrella of "green", we always find the ecological pillar as a dominant

issue. On the other hand, the social and economic issues of sustainability most often focus on occupational safety. At their most basic level, sustainability and safety consider the same thing: conserving resources. Whereas in the case of sustainability those resources are typically thought of as environmental, in the case of safety the resources are human [1]. In this direction, the primary goal of every employer should be increasing the quality of safety and health at work of his employees in their workplaces and preventing injuries and deaths through better sustainable concept. The importance of healthy workplace and working environment is a crucial factor in an individual's quality of life as well as in public health at the collective level [2]. However, OSH does not mean only protection of the employee from physical injuries and occupational diseases, but, considered as a multidisciplinary concept it should also be concentrated on the promotion of safety, health and welfare of people engaged in work or employment [3].Towards encouraging improvements in the safety and health of workers at work, the Framework Directive 89/391/EEC [4], introduced the obligation of employers to keep a list of occupational accidents resulting in a worker being unfit for work for more than three days and in accordance with national laws and practices, to prepare reports on occupational accidents suffered by their workers [5].

According to all statistics on a global scale of the EU, some of the most hazardous occupational activities are: the work in the construction sector, transportation and storage, as well as manufacturing and agriculture [6]. Unexpectedly high incidence rates of deaths, injuries and accidents at work especially in the construction sector are revealed in the available dates in both, the 28 EU member countries (EU-28) and other non–EU countries in Europe [7]. The Republic of Macedonia has to ensure higher OSH management level, in order to accelerate the process of accessing towards EU.

2 MATERIALS AND METHODS

2.1. Accidents at work in the EU-28

In the EU-28, in total, 3 176 640 accidents at work involving at least four calendar days of absence from work, occurred in 2014 only. Taking into account that the number of accidents registered as fatal is 3739, a ratio of approximately 850 non-fatal accidents for every fatal one is obtained [2]. Indeed, it is obvious from the analysis by activity, that the number of accidents at work varies greatly depending upon the economic activity, Fig. 1.

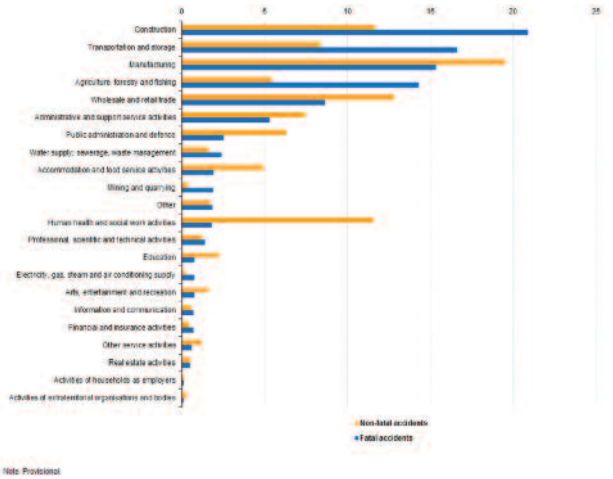

Fig.1. Fatal and non-fatal accidents at work by economic activity, EU-28, 2014 (Source*:* Eurostat).

Moreover, 67.2% of all fatal accidents at work in the EU-28 are attributed to the construction, transportation and storage, manufacturing and agriculture, forestry and fishing sectors together, and less than half, or 44.9%, of all non-fatal accidents at work are in 2014. By analyzing the figures that more than one in five or 20.9% of fatal accidents at work in the EU-28 in 2014 took place within the construction sector [2], logically, the construction is at the top of high-risk occupational sectors in Europe.

2.2. Accidents at work in the Republic of Macedonia

In 2007, the Republic of Macedonia adopted the Law on Safety and Health at Work [8] that completely takes over the provisions of EU Framework Directive 89/391/EEC [4], as a legal act of basic safety and health at work [5]. Based on the official data from the State Labor Inspectorate and the Public Health Institute of the Republic of Macedonia, statistical data on accidents at work occurring annually are obtained by the Macedonian Occupational Safety and Health Association [9-15].Disappointing is the fact that out of a total of 898 accidents at work and injuries that had happened within the period 2010-2016 in all sectors together, 261 or 29.06 % were fatal (Table 1).

Table1. Accidents at work in the Republic of Macedonia in the period 2010 to 2016.

Total number of accidents at work in the Republic of Macedonia from 2010 to 2016		
Year	All sectors	
	Total number of accidents	Fatal accidents
2010	129	44
2011	123	44
2012	161	45
2013	98	28
2014	130	42
2015	144	39
2016	113	19

The greatest number of accidents at work, 161, had happened in 2012 where 27.95% were accidents with fatal outcome. A decline was observed in 2016 when a total of 113 accidents at work were registered and 16.81% out of them were deaths, compared to 2011 when 35.77% out of a total of 123 accidents at work were fatal [15], (Fig. 2).

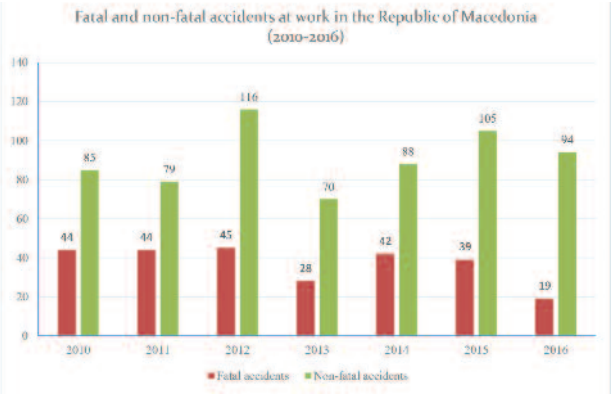

Fig.2. Fatal and non-fatal accidents at work in the Republic of Macedonia in the period 2010 to 2016 in all sectors together.

Despite all the controls being taken, unfortunately, the Republic of Macedonia still has a high incidence rate for fatal accidents at work which amounts 2.62 (out of every 100000 employees, 2-3 die) for 2016. Compared to some European countries [16], such as the UK, where the incidence rate for fatal accidents at work is only 0.5 [15], we are still far away from these results.

3 RESULTS AND DISCUSSION

According to the National classification of activities in the Republic of Macedonia, the 'Public administration, Police and Defense', 'Households as employers by their own needs and agriculture activities' and 'the Construction sector,' are counted as the most risky occupational sectors in the period 2010 to 2016 (Table 2).

Table 2. Accidents at work at the riskiest occupational sectors in the Republic of Macedonia in the period 2010 to 2016.

Accidents at work in the riskiest occupational sectors from 2010 to 2016						
Year	Public administration, Police and Defense		Households as employers by their own needs and agriculture activities		Construction sector	
	Total number of accidents	Fatal accidents	Total number of accidents	Fatal accidents	Total number of accidents	Fatal accidents
2010	26	0	22	16	17	6
2011	26	2	19	15	26	15
2012	45	0	19	17	28	3
2013	9	0	31	10	20	7
2014	47	5	23	17	12	5
2015	94	11	15	8	7	4
2016	46	0	23	9	18	6

Most accidents in this period, 2010 to 2016, 293 (out of 898), havehappened in the sector 'Public administration, Police and Defense,' out of which 18 or 6.14% were fatal. In the construction sector, 128 accidents at work had happened in this period and 46 cases out of them, or 35.94%, were fatal (Fig. 3).

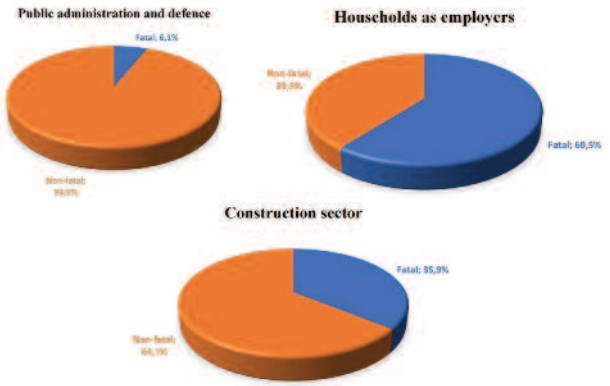

Fig.3. The riskiestoccupational sectors in the period 2010 -2016.

The greatest number of accidents with fatal outcome, even 92 out of a total of 152 or fantastic 60.53%, were in the sector 'Households as employers by their own needs and agriculture activities'.

In accordance with the OSH Law in the Republic of Macedonia [8], every employer is obligated to identify the hazards and risk factors related to work or working conditions, eliminate or reduce them and assess the effects of the remaining risks to the employees' health and safety [17].

4 CONCLUSIONS

Sustainable development means optimum use of resources in all respects. Defining the sustainable development as "...a strategy to meet the

needs of the present without causing adverse effect on health of the population, environment, or global resource base, hence without compromising the ability of future generations to meet their own needs",theRio Summit declaration [18], considers the essential needs to which overriding priority should be given, as well as the limitations imposed by the environment in meeting the present and future needs [19]. Consequently, all life sustaining processes, production outcomes and consumption endeavors should be sustainable, by pleasing the human beings at the centre of the concept of sustainable development, as individuals entitled to a healthy and productive life in harmony with nature.In accordance with the promotion of the European Union Information Agency for Occupational Safety and Health (EU-OSHA) that poor safety and health workplace always costs money [20], the creation of more jobs and better quality of work conditions has become one of the main objectives of social policies for every government [2]. Hence, developing a strong culture of safety and health in our country should be achieved by having engaged leadership working with a committed workforce toward the goal of zero injuries, illness and incidents [21]. Poor occupational health and reduced working capacity of workers may cause economic loss of up to 10-20% of the Gross National Product of a country [18]. Globally, occupational deaths, diseases and illnesses, account for an estimated loss of about 4% of the Gross Domestic Product (GDP) [19]. Despite all the controls and measures being taken by the Labor Inspectorate and publicly disclosed data by State Statistical Office, Institute for Public Health, Organization of the Employers of Republic of Macedonia and the Macedonian Occupational Safety and Health Association, occupational related accidents, diseases and hazards are estimated to cost the Republic of Macedonia between 2.6 to 3.8% of GDP [22]. This is a basis for serious concern and the problem grows further if we consider that many occupational diseases and workplace accidents remain unregistered. By analyzing the total number of fatal and non-fatal accidents at work in the period 2010 – 2016 revealed in the National classification of activities [9-15], from the annual reports of the Macedonian Occupational Safety and Health Association, we have obtained that most accidents had happened in the 'Public administration, Police and Defense', 'Households as employers by their own needs and agriculture activities' and 'the Construction sector'. Leader in fatal accidents for the observed period is 'Households as employers by their own needs and agriculture activities' with the greatest fatality rate of 60.53%, or 92 out of a total of 152 accidents at work. The main life-saving rules of our country are always designed to reduce risks during critical activities, provide an added measure of protection and strengthen our existing safety and health environment management system.Social and economic benefits of better health and safety at work have to be the main objectives of stronger national strategy in a good OSH management that will lead to benefit from many practices like reducing healthcare costs, sickness absence, and improving working methods and technologies [23].

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YOUTH AND GENDER!-THE ROLE OF PSYCHO-SOCIAL SERVICES IN GENDER EDUCATION IN THE SECONDARY EDUCATION SYSTEM. "CASE STUDY: MACEDONIA VS. ALBANIA"

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ABSTRACT: As many other societies, influenced by the dynamics of change, the Albanian society has begun to understand as well that the birth of a boy or a girl does not necessarily mean that they will further develop and grow to fulfill societal expectations. In this regard, acknowledging, rather than ignoring gender differences, is the only intellectually response to increase awareness about the phenomenon. Hence, this article is an attempt to identify problems and compare the psychosocial service system and the way they deal with gender education in the high schools of Albania and Macedonia. The main objective is to find the similarities and discrepancies between two the countries based on individuals who offer these services in high schools and how they contribute to the gender roles. How do they include gender in their working plans? What kind of activities do they organize in these terms and which are the areas that require further improvement? Is there any collaboration between them and the other actors involved in the education process etc. Based on a qualitative methodology and in-depth interviews with individuals working in high schools in Albania and Macedonia, this study proved that high school students perceive and perform gender based on their family lenses and models that often reflect the dominance and superiority of the masculine power. It was also clear that the individuals responsible for offering psychosocial services face numerous problems and challenges that are intensified due to the delicacy of gender as a paradigm, the low level of information and fragility of their age.

Keywords: Education, gender roles, psychosocial services.

1 INTRODUCTION

The level of information and awareness on gender identities is essential to how a young person interacts with peers, family members, how he/she takes decisions and makes choices in life and how he/she behaves while faced with conflict. Pre-university education coincides precisely with the time when the young individual is at a stage of development where his worldview shapes from everything that surrounds and interacts with him as part of the social environment. Education on gender identity and the roles that derive from this identity, at this stage of life are crucial towards a tomorrow's society, which seems to be developing day by day as a society "*beyond pink and blue*"[1]. In this new stage of development, sex, gender identity and their performances are constantly changing. Although these three definitions, often perceived as synonyms of each other, are essentially different, they do often confuse researchers, young people and specialists offering psychosocial services as well.

In this regard, we consider it important to make a preview of the main concepts that will be commonly found in this paper. Sex, or biological gender, refers to the identity given to the individual

[1] The metaphor is inspired from the book "*ParentingBeyondPink&Blue: How to RaiseYourKidsFreeofGenderStereotypes*"

immediately after his birth based on his sexual organs. This definition may or may not fit in the way individuals think of themselves. That is why it is precisely the gender identity that refers to the way the individual perceives himself, how the individual chooses to appear to others, which may not coincide with the sex or the biological identity. In a simpler way, biological sex (female, male, transgender) depends on the individual's physicality, while the gender identity (man, woman) is determined by the way an individual feels or sees himself and it is an perception of himself, which goes beyond the genitals. Manifestation of gender is in fact a social construct that depends directly on the society or culture in which it appears. Although societies are still inclined to see these categories in binary views, gender issues are more complex. Children use to meet the expectations of parents and others in line with gender identities. One learns what kind of behavior (gender expression) is acceptable to the society from a woman or a man (meaning gender identity), while respecting the identities of others in the society where he/she lives. 'The standard that people are often encouraged to follow is that women have long hair and wear skirts, and men have short hair and wear pants'. By acknowledging that these standards are created by society, we can learn to accept people who express themselves differently from the standard. The social environment, in which the individual interacts, plays the biggest role in this regard. Just like many authors unanimously point out to this issue, (Larson, 1977); (Abbott, 1988); (Fauske, 2008) when they say that conventional new theories underline the fact that to advance, actors are directly dependent on the dynamics of their interaction with the social environment. It is up to education to change certain perspectives and break down typical stereotypes related to being a man or a woman in a particular society or culture. From a feminist and critical point of view, the authors who proposed introducing gender theories into most professions related to social sciences are Witz (1992) and Davies (1995, 1999) who underline exactly the need to include gender perspectives in general theories of professions.

2 SCHOOL PSYCHOLOGIST AND ACCESS TO GENDER ISSUES

According to the National Association of School Psychologists, school psychologists are uniquely qualified members of school teams that support students' ability to learn and teachers' ability to teach. They apply expertise in mental health, learning, and behavior, to help children and youth succeed academically, socially, behaviorally, and emotionally[2].

Early education of younger generations is of great importance and the psychologist plays such an important role in the education of gender roles and sexuality of youth during the period of secondary education. This field of his work involves not only the teaching process as part of education, but it continually refers to the student's personality as a member of the school community (White, M. A and Harris M. R, 1961: 35). Thus, the psychologist plays a decisive role in educating younger generations during secondary education through the counseling of the individual. A school psychologist is a specialist in general psychology, whose goal is to bring a psychological perspective related to customer service services. This perspective results in the approximation of inclusive psychological services of direct and indirect nature (Fagan, T. & Wise, P. 2000: 73). For example, we are all witnessing that in terms of the choice of profession, most young people are still gender based and how some professions categorize masculine and some other feminine. The psychologist as part of the team offering psychosocial services can offer various activities on helping youth getting orientated in not categorized professions as for females or males.

2.1 SOCIAL WORKER AND HIS ROLE IN EDUCATING GENDER ROLES

Social workers are professionals who can explain well gender issues and nowadays they are an active part, continually lobbing on equality between the two sexes. A particular feature of social work as a profession and gender issues is related to the history of the birth of social work as a profession initially being performed by women. It is widely known that the historical roots of social work are related to charitable work (in the context of social needs and the fight against poverty), as a work which is related to the unpaid work of women. The theoretical foundations of social work relate to the exploration of human behavior,

[2] https://www.nasponline.org/about-school-psychology/who-are-school-psychologists

social systems, and the principles of social justice (Levin, 2004: 76). Social workers are academically and culturally competent and inclusive when it comes to human sexuality and gender identities. They recognize and accept the great diversity that exists in the world where we live and advocate for the right of every individual to choose sexuality and to display his gender identity. Social workers strive to create an inclusive environment regardless of the individual or social group to whom they offer social services. Using work-related skills that aim at inclusion, especially in relation to sexual and gender minorities, try to stimulate a safer and therapeutic environment for all individuals. Their task is to empower the individual and to help their empowerment and marginalization in such a case. However, when it comes to sexuality and problems related to gender identities, their work can often be difficult because of the cultural potential, personal and religious taboos experienced by both parties (the social worker and his client). As part of the social services team in high schools, the social worker has strong and continual cooperation with the psychologist and pays constant attention to gender issues towards youth education. Of course, social workers, as well as psychologists, work very hard on teaching youth about gender roles, conducting successful individual counseling, focus group discussions with them, counseling sessions with the teaching staff and counseling sessions with the parents.

2.2 PRE-UNIVERSITY EDUCATION IN THE REPUBLIC OF MACEDONIA VS. PRE-UNIVERSITY EDUCATION IN THE REPUBLIC OF ALBANIA

Pre-university education in the Republic of Macedonia is regulated by the Law on Secondary Education, published in the Official Journal of the Republic of Macedonia no. 44/1995. Over the years, the law has been revised and has undergone constant changes, with the latest revision being made in 2015. This law regulates the organization, functioning and management of secondary education as part of the education system in Macedonia[3]. The first significant difference between the secondary educations offered in the Republic of Macedonia compared to that offered in Albania is related to the fact that secondary education in Macedonia is compulsory[4]. For all the students who complete 8-year education (or 9-year education with new changes) secondary education is compulsory, otherwise there are foreseen penalties for the family (or legal custodian of the child who has not reached the age of 18 yet). Namely, a fine worth up to 500 Euros is foreseen.

The second difference refers to the way in which parallel classes are organized. Due to the multiethnic character of the Macedonian state, secondary education is offered in different languages for different ethnic communities. High schools are organized in parallel units of students grouped according to the language in which they attend secondary education[5]. At the other hand, according the Law on Pre-University Education, in the Republic of Albania education can be provided in another language other than the official Albanian language but only ona few specific subjects: "*Persons belonging to national minorities are offered the opportunity to learn in their mother tongue language, to learn their history and culture, according to curricula*"[6]. However, it is in the interest of this paper to bring a comparative approach to how the psychosocial service works in secondary education in Albania and Macedonia and to analyze the advantages and disadvantages of each service system.

2.3 PSYCHO-SOCIAL SERVICES, A COMPARATIVE APPROACH

In the Republic of Macedonia, psychosocial services in high schools are provided by a multidisciplinary team consisting on a psychologist, a pedagogue and, in rare cases (when required by the school itself) a defectologist. The two dominant figures in providing psychosocial services are the psychologist and the pedagogue, who have the status of professional collaborators and whose work is to assist and provide support in the teaching process for students and parents. The teamwork consists on counseling work and efforts to respond to educational policies that focus on inclusive education. Precisely within the scope of inclusive education are clearly described the tasks

[3] Law on Secondary Education, 44/1995, RM, Article 1.

[4] Ibid, Article 3

[5] Law no. 69/2012 On the pre-university education system in the Republic of Albania, Article 10

[6] Ibid, Article 4 of the Law: *"For members of the community attending secondary education in a language other than Macedonian and its Cyrillic alphabet, in public secondary education, teaching and educational activities in high schools are conducted in the language and alphabet of the respective community, under the conditions determined by this law* ".

of their work in the team. [7]

They are responsible in drafting action plans and annual programs for their work, in order to support the educational process and to ensure qualitative education for each student. They pay particular attention to the particular needs of the students and engage in compiling the pedagogical profile of the student. They do also provide support to the pedagogical staff and pay attention to students with special needs by identifying their needs and assisting to the staff with professional trainings how to teach in a class characterized by diversity. The team offers assistance in the development of the individual education program and the pursuit of the effects of the individual education program; participates in solving problem situations between students and teachers; assists teachers working with students with special educational needs in the implementation of practical teaching at school and abroad[8].

In fact, the thing the mostly distinguishes the team that provides psychosocial services in the secondary education in Macedonia is the work of the psychologist whoactually is of the utmost importance compared to other figures. Even the Law on Secondary Education emphasizes the importance of its work on the three levels of counseling: students, teachers, parents. The psychologist conducts group-counseling sessions with parents and records or keeps minutes on the progress of the counseling process[9]. According to the law on secondary education in the Republic of Macedonia, a psychologist or pedagogue at school prepares a weekly and monthly plan and has to organize counseling sessions with parents, in accordance with the provisions of paragraph (1) of this Article[10]. A school psychologist provides continuous counseling and according to the law, each school must have a psychologist as part of the team, which provides psychosocial services. Thus, in accordance with Article 58 of the Law on Secondary Education, a psychologist will carry out counseling[11]. However, it is not always possible for each school to have a psychologist. In this situation, when the psychologist is absent, his duties have to be done by the pedagogue. Article 58-b / 2 expressly states: *"If the school does not have a psychologist, then counseling is done by a pedagogue"*. In addition, the law provides Article 58-b / 3, when a psychologist and pedagogue isabsent from a school as a substitute figure, counseling hours must be maintained by a psychologist or lecturer of another secondary school[12]. Pupils who receive psychosocial services in high schools are usually classified into three groups: a) Those who need individual psychosocial services; selection based on pupil's behavior; sequencing success and work (in the framework of pedagogical measures) work with small groups. Teachers do usually signal the second group of students who usually have problematic behaviors or come from families with social problems. The third category of students refers to those to whom is given assistance or support when required by the parents themselves or after students' own initiative. Meanwhile, in the Republic of Albania, psychosocial service is provided by two central figures: the psychologist and the social worker. Local educational units provide psychosocial service to students and employees of educational institutions. Psychosocial service provides support through psychologists or social workers to address the issues of various cases to assess cases of children with special psychosocial needs, design preventive programs, according to the needs of the school community[13]. The Regional Educational Directorate (RED) / Regional Educational Office (EO) is tasked with organizing the establishment of the Psycho-Social Service Unit[14].

According to the Law on Pre-university Education 69/2012 and the Normative Provisions of Pre-University Education, the duties and responsibilities of the psychosocial experts are outlined below: The psychologist/social worker hasthese main tasks in the educational institution:

In cooperation with teachers and parents, he identifies and evaluates as early as possible students with behavioral problems or difficulties in learning and after that he designs/applies for these students individual preventative or rehabilitative plans.

Assists teachers, parents and students in prevent-

[8] INCLUSION in vocational education: Ahandbook for work with students with special educational needs, p. 36-37, Skopje, British Council, 2014.

[9] Ibid, Article 58-b / 1

[10] Ibid, Article 58-b / 1

[11] Law on Secondary Education, 44/1995, Art. 58

[12] Ibid, Article 58-b /3

[13] Law no. 69/2012 On the pre-university education system in the Republic of Albania, Article 20.

[14] Order No.344 dated 19.08.2013, Ministry of Education and Science

ing or eliminating abuses of teachers against students, students to each other, abuses with alcohol, drugs, etc.

Informs through lectures, educational institution employees on typical student age development and the typical problems students encounter during learning.

Assisting foster teachers and subject teachers to integrate children with disabilities into the classrooms of ordinary educational institutions.

Advise students for their careers.

Administer and interpret psychological tests (by psychologists).

Complete individual files for cases of students who have benefited from psycho-social service.

Report to the head of the psycho-social service unit any data about student's abuse by the educational employee or student's parents.

Participate in researches envisaged in the unit annual plan[15]

3 RESULTS AND DISCUSSION

The purpose of this study is to understand the role that social workers, school psychologists, etc. have in educating gender roles in secondary education. Based on an in-depth interview, by interviewing 12 psycho-social service specialists, the study sought to find out how effective these services were, and bear in mind the importance of creating a healthy gender identity for young high school students. For the realization of this comparative study between Albania and Macedonia, six secondary schools were selected in the city of Skopje and 6 in Albania, respectively 3 in the city of Tirana and 3 in the city of Durres. The responsible persons at each school were contacted by the authors themselves, whose addresses were taken by contacting school directories or in some cases from personal acquaintances. In-depth interviews were built on databases, with the aim to address the different aspects of school policies, laws and international strategies. In this part of the paper, we will focus on analyzing the data from the interviews by analyzing each question. To respect the differences between the findings, the part of the analysis is divided into two parts; in the first part we will analyze the data obtained by the secondary schools of the city of Skopje and in the second part the data obtained from the secondary schools in the city of Durres and Tirana. Inthe end, we will try to find the points where the two realities are shared and merged.

3.1 RESULTS FROM SKOPJE

In Skopje, we interviewed 6 social service specialists. The very first question was about the number of specialists who provide psychosocial services in these schools; the dominant answer was referring to 3 persons being responsible for psychosocial services, exactly the psychologist, defectologist and pedagogue. Secondly, they were asked about the number of students receiving such services; the interviewees communicated different data up to the school. In 3 of the schools, psychosocial services are mostly received by first-year students who make up the largest number of students. According to Macedonian law, in 500 students there must be a psychologist offering psychosocial services. But what resulted from the interviews was that most of the schools have only one psychologist for the entire number of students (differing from 1000 to 2000 students). In addition, they were asked about the focus of their work and the interviewees answered that their work during the first two years of high school is more focused on counseling, while in the third and fourth years, it is noticed a distancing of students to receive such services. In one of the sampled schools, the person performing the role of a social worker was a pedagogue who claimed that they were working with students of all the same years, while in two other schools the responsible person was a deftologist and two employees asserted that their role was more prone to cases of students with learning disabilities and those with special needs.

In question 3 and 4, respondents were asked who the most informed staff members about gender equality issues were and who werethe ones in need of additional training. According to them, female teachers show more sensitivity and disposition to such topics. The problem they noticed is that gender balances themselves in institutions where they work and show gender equality models among the unclear members. What is noticed is that one of the male respondents shows that

[15] Normative Provisions of Pre-University Education, 2013; 44/45

such differences do not exist which makes us think that the lack of equality in schools as an institution is worrying only for the female gender while for the other gender this ratio is normal or better saying something natural. The same interviewee claims that this is not a matter of particular importance and that schools have more urgent issues than this. Meanwhile, for female respondents, this problem is of particular importance and the entire staff should be trained to overcome prejudice and the structure of sub-cultural thought. Seminars or other information events are a good way to tackle this problem and make it part of the debate at school and in public opinionas well. In questions 5 and 6, respondents were asked how they could assess the level of student information about gender issues and which gender was easier to talk about for these topics. One thing they agree is that the level of information on these issues is at the initial level. "Although we can say that the change is felt and the students are sufficiently informed,they are more exposed than ever to information and this has made somehow aware that the position of the female gender has changed. However, I think thereshould be a special program in schools (a program of activities or subjects, or differences in the subject of Sociology) so that students can get more information. Currently, we as astaff that provide psycho-social services do not have seminar topics in our annual work plans dealing with gender issues. We are more focused on counseling work" – one of the interviewees said.

As expected, while asking who is easier to work withor talk about, in most of the interviewsit turned out that women tend to be more open to discuss issues of gender identity or discrimination. Another factor that seems to be influencing is that out of the 6 interviewed in Skopje, only one is male and five are females. In a way, the school reinforces gender stereotypes and students seem to follow, even unconsciously, existent schemes. This scheme seems to emerge even when these students decide which professional direction they will take by choosing the university study program, and apparently, they think that some professions are for boys and some for girls and it is not seen as reasonable to put it on discussion or experiment.

"What is your perception of the following statement: Are female students more likely to understand gender equality issues compared to the other gender?" - was the next question in the interview and from the responses it turned out that the level of information and reaction was different. Although we may believe that girls as boys are equally informed, what is noticed is that they react differently; boys are mostlyindifferent and girls are many times more understanding and all this happens because of the traditional way and patriarchal structure where they have grown up and received the first lessons on gender roles. In such a situation, it is very important to analyze the methods of informing and raising student's awareness on gender roles. For some of the respondents, they claim that the psycho-social services team has not organized activities focusing on gender equality issues although they may have been invited to classes,in particular during the days devoted to violence against women. On the other hand, teachers seem to make an effort to fill this empty space by organizing special lessons about their curriculum topics.

One other important result is the perception of the specialist about students' parents. According to them, they are often an obstacle to the awareness of gender roles. Asked if there are regular meetings with parents, they answered that fathersare more likely to attend meetings more frequently compared to mothers, even though there are cases where is required the participation of both parents. Often, they are not cooperative or hermetic about these issues, and there are times when they justify the behavior of the violence that their boys may exhibit. It is precisely these parental excuses which have become the cause of many problems encountered in schools. Respondents claim that boys openly display the dominant tendency towards girls, who then think that boys are more privileged by the professors. The last two questions of the interview were intended to capture data on the impact of the activities that have been made so far to raise awareness on gender roles and it turned out that since such topics are not part of the annual plans they organize, it is difficult to give data on the impact they have.*"Truly such themes come only in sporadic forms without reaching a consolidated place in the course of the topics that we treat throughout the year"* – one of them stated. They argue that to enhance efficiency, it is necessary to integrate such topics into annual plans, add extra-curricular activities and maintain continuous trainings, even

though this has a huge financial cost for the school. In conclusion, they reiterate the idea that there should be well-qualified specialists in the school to work with students and, in the face of the growing problems that these students have, it is necessary to increase the number of specific education employees in this field, because they can make a real contribution to improving the situationonly in this way.

3.2 RESULTS FROMTIRANA AND DURRES

Interviews with psychologists or social workers in Albania reflect to some extent the same not so positive picture as in Macedonia. In the 6 state high schools where we went, 3 in Tirana and 3 in Durres, psychosocial services were mostly covered by psychologists who had finished their specialization in school psychology; only in two schools in Tirana these services were provided by social workers, and for this position there was only one employee for the whole school. As high schools have between 700 and 1200 students, psychologists or social workers set up a schedule so that they could meet or provide psychosocial services to a large number of students. Asked which staff members they worked withdisplay high level of information about gender equality issues, the interviewees claimed each in their interviews that teachers of social disciplines showed a higher level of awareness on these issues and surprisingly the management staff of the school had a special sensitivity on including this topic in school activities. However, in the next question on the need for further staff training, in Durres schools there is a higher level of awareness than in the capital. All three Durres respondents stated that "due to the fact that they are the central school in the city of Durres, they are qualified in dealing with issues related to gender equality, especially the topicsof social subjects." In the two schools in Tirana, more or less the same answer was received. However, there is still a need for more information sessions or trainings to prepare psychosocial service staff to cope with all the situations that may arise at class levels related to gender discrimination among adolescents. Although today the information sources are infinite, high school students have an average level of knowledge of gender identity, leaving vacant spaces and opportunities for bad information. Which of the two sexes makes it easier for you to work when dealing with issues related to "gender communication" and why - was the next interview question and as expected, without wanting to reinforce gender stereotypes, psychologists or social workers claimed that "it is reflected a greater ease in dealing with this issue with the female gender. This is due to the fact that girls, who feel the phenomenon of gender discrimination, are more inclined to increase their position. Boys were less likely to come to consult with them, as they were more difficult to talk about topics they perceive as natural. Asked if these students are influenced by information on their gender identity in university choices, psychosocial workers claim that this variable does not affect the choices they make compared to the high impact of parenting or job market demands. This information seems to be a bit difficult to decipher for our study because as the family and the labor market are known without wanting to reinforce gender stereotypes, therefore, psychologists or social workers should be cautious about the secret mechanisms that affect these choices. "What is your perception of the following statement: Are female students more likely to understand gender equality issues compared to the other gender?" - was a question that we devoted a lot of weight to the study, but again here there werethoughts and ideas that girls are the ones who are more inclined to engage in discussions and the application of various issues related to gender equality. Psychologists see this trend as a tendency for girls to be protected from discrimination and to grow emotionally and professionally.

Information is a very important process to raise youth awareness of gender roles, and psychosocial workers in schools say that in addition to disseminating information brochures, occasional open case presentations or models that oppose gender stereotypes are developed when young people have the opportunity tobring facts or myths that they carry over gender roles. However, work with parents remains a major challenge because they take very little part in psycho-educational meetings, whoare few in number. "That being said, we encounter many problems in our daily work as a resistance by young people who refuse to cope with mental retardation or even worse resist social pressure resulting from non-typical gender performance. There are times when girls or boys show behavior that is not typical of what is expected of them, which turns into a psychological boomerang for these young people, who then ex-

hibit trends of shaky gender identity". When asked which metric indicators they use to understand the effectiveness of educational activities, psychosocial workers claim that the indicator for themis the reduction of gender-based violence cases, involvement of students in activities in which they have been typically separated, as well as improvement of communication between boys and girls. "We are happy when the football fields in schools are filled with boys and girls who do not laugh when their peers play with the same passion and technique. It is a very small detail if you believe it is an achievement "- says one of the psychologists of one of Tirana's schools. After all, we may have won only one or several small battles; there is a lot of work ahead. We must continue with qualifying sessions on a continuous basis to recognize and adapt new contemporary methods in terms of education on gender roles. Brochures provide more psychosocial services as well as methodical materials that should become part of teaching and extra-curricular activities.

4 CONCLUSIONS

The gender variable undoubtedly plays an important role in the scientific developments of recent years, a trend that has embraced both the country and our region. What is noteworthy, however, is that the debate on gender, identity and being a man or woman is more localized in the political aspect of violence and is rarely integrated into more specific disciplines such as psychology or social work. Literature in gender studies strongly suggests researchers to stay in such fields because gender seems to be a reality many times more complex than quotes and education needs to start early. School is one of the main stops where young people can reinforce their gender stereotypes. But if we want to grow a healthy generation, it is important for this institution to include all the right mechanisms to improve the way they think about the identity of their gender. This study was intended to highlight the role played by social workers or psychologists in gender roles education and by analyzing 12 secondary schools, 6 in Skopje and 6 in Tirana and Durres, some important conclusions could be highlighted. First, all schools had a person in charge forproviding psychosocial services, a small number compared to the high number of students who needed to be offered this service. Another phenomenon that was observed was that the profile of the person often ranged from psychologist to social worker, pedagogue or defectologist. This made it difficult to get the proper profile for this service. Out of the 12 interviewees, 11 of them were female and only one male. This is a significant indicator for the fact that this is thought to be a more preferable and more suitable profile for girls than for boys, a stereotype that also influenced the fact that girls were the ones who tended to receive more services than boys who are less concerned with the "natural" tendencies of being a man or a woman. From the interviews, it turns out that the situation seems to be a bit better in Albania, especially when referring to the level of youth information, staff training or information sessions, while in Skopje there was a little more traditional trend than this process was also seen by the self-persons providing psychosocial services. In both contexts, there was a lot to be done to increase the training of both pedagogical and psychosocial staff, to improve and involve parents actively in this process, as well as to create more opportunities when young people learn and understand more about gender realities.

RESTRICTIONS AND NEW RESEARCH PATHS

Research in the field of psychosocial services and other related research areas are still scarce in Albania and Macedonia. For this reason, there is a need for such research and attention onyoung researchers who have to stop in specific practices that make this profession so important. One of the achievements of this study is that it brings together the discipline of social, psychological and communicative work to better understand how the gender roles that we are learning are influenced not only by the family, but also by other instances such as social workers and psychological services in schools. Another benefit forthis study is the federal approach of bringing two realities, Macedonian and Albanian, closer to the points where they are divided and united. However, it should be borne in mind that the small number of interviews carried out, as well as the distance between the two countries, make the data of this study to be taken only as pilot study data, but that can be applied in the future for more cities and schools.

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INNOVATIONS IN TEACHING A COMPARATIVE STUDY OF FOREIGN LANGUAGE EDUCATION

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ABSTRACT: This research study represents a comparative structure of English Language Teaching (ELT) among Portuguese and Kosovar Language Faculties in 2016/2017. It is an attempt to present the essentials of ELT in Portugal with all generalizations observed by a non-Portuguese researcher; it also aims to grasp the best of it and benefit to Kosovar (and other counties) educative systems. The researcher was personally and professionally integrated in this study that involved relatively the same study procedures in two countries in a period of six months: class observations in Portugal, and students' interviews in Kosovo. Firstly, there were those study procedures/classroom observations in Porto that identified how ELT activities could be adapted into better learning activities. Secondly, there were those study procedures relating to how the teachers and students participated in EL class in both faculties. Any comparison made in this study between teaching/learning English in Portugal and Kosovo takes into account the differences the students have in both countries. The study concludes that every comparison which takes into account the advantages of methods used in class compel EL teachers to carefully plan their teaching time for the purpose of better and easier English teaching and learning. Additionally, this means the empowerment of students with knowledge in terms of skills and opportunities to use English as a solution to catalyze linguistic changes in language usage and enhance further English Language Learning (ELL).

Keywords: ELT, skills, teachers, comparison, enhancement.

1 INTRODUCTION

English language 'as a global enterprise', gives all world's people a complete and unique system of communication. It is widespread as a first language, second, or foreign language that has been taught since early years. In order to be 'socially' and 'academically' integrated in current world's challenges, as well as having or creating a new and unique framework of ELT all around, it is of a great importance, especially in higher education (HE). If we analyze English Proficiency Index (2016) Rankings, Netherlands, Denmark and Finland are the three leading countries of English language skills, i.e. they are in he very high ranking list, (English Proficiency Index (2016)), while Portugal is in a higher ranking list. Unfortunately, this list does not include the Republic of Kosovo. However, no matter the place, English language is important in global aspect, and the fundamental challengesof English language learning would be of a great help:To help EL teachers 'ease' their teaching and help learners 'ease' their learning. When considering English language teaching and learning, Topkaya&Çelik (2016) conducted a study in order to find out how non-native English language teachers seek to improve themselves and their instructional practices through Professional Development (PD). Çeliketal.(2013) discussed about the necessity of the PD, adding that it is a critical factor that

helps in improving teaching practice. As Richter et al. (2011) point out, PD is characterized as a professional long-term learning process, starting from university level and expanding to in-service training at workplace. However, no matter the English level the teachers are teaching, PDis a prerequisite of the 21st century. It involves the use of innovative teaching/ learning skills and knowledge, different teaching/learning resources, exchange teaching programs, exchange of the teaching experience, co-teaching, reflection of the teaching experience, etc.As such, it is of great importance to have discussions about our HE system, analyze it and compare it with other countries' Higher Education Institutions (HEI).Based on that, this paper tries to discuss the difference between the ELT practice in HEI in two counties (in which English language is considered to be a foreign language). It also tries to grasp the best teaching model and share it withall FL teachers, hoping to have a big impact in FLT in glocal aspect (GLObal and loCAL).

Since there have not been any other comparative studies in the field of ELT between the two universities, University of Porto, Portugal and the University of Prishtina, Kosovo, it is expectedthat this study will reflect some ELT facts that can be beneficial for the education system in general.

When discussing about the HIE and The Common European Framework of Reference (CEFR) for languages, including learning, teaching and assessment, it is worth mentioning that HEI in both countries (Kosovo and Portugal) share a common part of curricula that is considered as the basic content to all students, Mira Leal et al. (2013); while the other part of curricula is determined according to each country's educational characteristics which is adopted by their professional/educative representatives, Hismanoglu (2013). In addition, when discussing about a tutored ELT setting, the CEFR andthePD, thesolid ELTdeals withprospective EFL teachers who know about the CEFR, andwho read the CEFR, Hismanoglu (2013).

In line with ELT issues, Coe et al (2014), Hismanoglu (2013), Topkaya&Çelik (2016) explain the 21st ELT issues in different aspectsby contrasting the major distinctive features among them. However, they do not suggest to stop considering one feature only, or continue with the other one, but to put a balance on what teaching elements contribute to students' (and teachers') learning and use them properly. Again, it'steachers' responsibility to undertake a personal learning journey,i.e. PD which is based on their level of knowledge and skills. The teaching methods support the learning 'mission' for everyone: each student (and teacher) is unique and has unique ways on how to learn best. Additionally,Coe et al (2014)mention six components of great teaching: content knowledge, quality of instruction, classroom climate, classroom management, teacher beliefs, and professional behaviors i.e. that students should be helped to recognize their own learning needs and to find strategies to meet them. Considering these components, the study agrees that teachers should applyart-craft teaching approaches, i.e. they seek to develop ELT by applying a unique set of personal skills in different ways. Nowadays, these skills can all be applied as the English language teachers are free to modify and adapt, asses and re-asses their teaching and their teaching material that are based on the students' needs.

According to students' responsibilities, the study considers Coe et al (2014) review about the development of each students' existing abilities (and teachers' ones), capacities and skills in a way that is personal and relevant to their own studies and aspirations. Therefore, the use of different teaching methods in a foreign language class requires a great number of activities that need to be integrated carefully and skillfully. Keeping in mind the fact that good teaching

habits need practice, enthusiasm and creativity, the study deals with ELT issues in Portugal and Kosovo and aims to discuss the extend of differences ofELT between them. Additionally, based on the learning environment, the learning material, teaching methods, students, teachers and their EL teaching learning responsibilities, the study continues by contrasting and comparing both institutions. It is believed that the efficacy of this descriptive/comparative study about English teaching and learning is beyond doubt.

2. METHODOLOGY

This study was conducted during a period of one semester. It started in September 2016 and wasfinalized in February 2017. The study included two study instruments: study's observations at the Faculty of Arts, (Faculdade de Letras da Universidade do Porto - FLUP) in a period of four months, September - December 2016, and Kosovar students' interviews at the Faculty of English Language and Literature in Kosovo in January 2017. Classroom observations at FLUP included fifteen observations of B2.1 English language level, which were taught by three teachers: (Teacher A, Teacher B, and TeacherC).

As the educative semester of the HEI in Kosovo ends in January, and the researcher could not have time to observe classes, the study shifted to individual meetings with the Kosovar students. For the sake of being more objective towards the ELT system in Kosovo, the study considers students' interviews which include questions about the teaching time, classes, number of students in each class, the teaching material, likes and dislikes in English language classes, ELT issues in HEI, students' opinions about needs and demandsin English classes, etc.

3. COMPARATIVE FEATURES OF THE LOCAL TEACHING CONTEXT IN PORTUGAL AND KOSOVO IN 2016/2017

3.1 Portugal – Classroom Observations

As mentioned above, this study includes fifteen B2.1 General English classroom observations. Seven observations are from teacher A, four observations from teacher B and four from teacher C at FLUP in the period September - December, i.e. one semester, fifteen weeks of teaching. Based on the observation sheets, the overall discussion is given below:

General English B2.1 classes at the University of Porto include fifty students in whole classes (inone hundred and twenty minutes), while in tutorials classes the groups are divided: there are twenty-five students in each group (in one hundred and twenty minutes). The language of instruction is English ONLY. Each group has around 20-25% mobility students, i.e. the average number of students in each group is 5-6 foreign students (from Brazil, Mozambique, Bulgaria, Japan, Check Republic, Belarus, Russia, Shri Lanka, Germany, etc.). General English Language teachers at the University of Porto are English native speakers.

The teachers can also speak Portuguese, which makes their teaching much better because of knowing the possibility where the Portuguese students are likely to misunderstand patterns, to make mistakes and/or to go wrong with the FL, i.e. English. They are also able to understand the patterns in L1 if used by the students and are able to comment on them. These comments are always in English, meaning that Portuguese language is rarely used among the students. Mobility students, who use English as a media tool, are considered as the controlling factors in group work tasks.

Present-day topics about English speaking countries seem like wanted and useful topics. (The teachers do not use UK facts as examples only). Instead, they all try to use topics or examples from around the world, suggesting that UK topics are already known to the students. The adapted text booklets B2.1 'Textos' are followed by B2.2, B2.3 'Textos' in other semesters to C1 in the third year (fifth semester). They are planned and prepared for one semester learning.

4 Discussion of General English B2.1 Level Observations

Relating to the design of B2.1. General English level booklet 'Textos' and the decision to develop and produce a specific GE book, the study has found that this very specific book includes long and/or short texts, questions and answers, dialogues and role-plays, listening parts, matching activities, discussions, opinions, decisions and pictures. The students are confronted with these activities and are fully involved-incorporated in the teaching process. Observations reveal that EL activities focus as a conscious and as an unconscious learning process, i.e. meaningful learning and natural everyday language use. The fifteen observations disclose activities that are suitable for B2.1 level, aiming at 'interculturality' and 'multiculturality,' as well as being suitable for students' learning abilities.

Teachers are aware/realize to clarify to those students' explanation statements that are not simple/clear enough, therefore they added extra explanations within the statements, which made teaching/learning more interesting. All those "extra explanations" are connected to real world and exhibited a sense of humor.

The study has noticed that teachers are able to transform the books' facts/life facts into student' language usage.

They are able to add additional support by showing enthusiasm while teaching; they knew much more about the topic and added extra statements that are not in the book. In all observations, constructive explanation is evident and the students all know what to do next. Teachers try to keep a balance in working up activities. Reading, speaking, finding a partner for the next task, or making group activities are all balanced. They show competence and professionalism, being aware that some (same) activities in different classes need different time for different groups.

All activities show supportive learning environment and enhancement in student's confidence in language use. Students can change the ways of thinking and speaking, they can change the way of the 'comprehensible input' to become a 'comprehensible output'. Classroom observations, from September to December, prove that the students have become less anxious and more independent in the use of language patterns, i.e. they are challenged upon improving language use.
When dealing with the Situational Teaching (ST), teachers are confident to clearly present the topic, without fear of being misunderstood. If they notice students' misunderstanding, they interfere and explain to the student. They are concentrated in oral practice, mainly focused on critical thinking and 'vocabulary creativity'. In addition to 'the group variations,' B2 English level students show interest to follow and support language patterns. They are able to recognize and understand those patterns, as well as to distinguish them according to language varieties. Teachers are prepared to deal with 'less understandable' topics or patterns. However, they sometimes leave students without much specific guidance and explanation.

Comment: Teachers explain the patterns to students, but they do not spend much time with the same pattern. The same (difficult) exercise is not repeated, if conducted by a good student.

The study justifies this with the'students' intelligent guesses' thathelp them become more effective performers of a task, by being more adaptable, creative, inventive and above all independent. As such, the study considers that students can perform better not in tasks only, but they can perform better in every aspect of FLL.

Teachers carefully but quickly choose tasks for GE which reinforce collaborative work. Interaction patterns, as important principles in GE, are often used. Likewise, the variety in teaching such as various presentation styles, individual work, pair work, group work and moving round in class made English learning more interesting and pleasurable, shifting from quiet exercises to those noisy ones always followed with enthusiastic learning approach.

In six observations, the study has noticed that fast finishers might be a problem. Although the teachers always have plan B 'in their teaching pockets', six observations have shown that fast students are left without any extra activity after finishing the task (group work). In these cases, they just finish the task and start talking to each other (in their native language). Nevertheless, not for a long timeteachers usually use the expression 'Time's up!', or 'OK, now!", which means that all students have a limited time to finish the activities.

Encouragement while reading, in participation, in collaboration-a pleasant, relaxed atmosphere in the classroom, increased students' self confidence in English language learning and English language usage.

Comment: Reading a long text aloud is not applied; however, reading texts is very common, then encouraged to participate with students' personal opinions in group work. It is noticeable that teachers use different activities for the purpose of English proficiency. Even then, few students (quietly) seek to translate the English discussion into their native language, which sometimes manifests native language use in B2 English classes.

New patterns are presented in different situations in order to clear up the exact meaning. And most of the students can get the chance to be involved in interaction, in a very natural situation. All students are engaged in language learning activities, being mentally involved mostly, while physical involvement (moving in groups) is not left behind even though a large number of students in classes could be considered a disadvantage.

Gestures and moving around the class is paramount element in EL classes. All observations evidenced teachers' moving from group to group. Two observations show that teacher B seemed more superficial, not really attached to the groups. However, teacher's control over the task is always the primary concern. All observations show that teachers' gestures provided and clarified meaning of different contents. Body movements, gestures, eye contacts, all try to help the students to give a kind of instructions for English language output.

The study observations have noticed that teachers apply the eclectic approach as the 'umbrella approach' that covers students' learning weaknesses and enhances students' EL development. Despite this, few students compared to other students in class maintain quiet. However, based on an extensive series of observations, it is found that those 'quiet' students who reflect their communicative

uncertainty are mobility students who have had language barriers either from their poor language, or their country's educative teaching/ learning system is completely different.

Regarding Coe et al (2014) who point out thatit is crucial to understand students' learning styles, in Portuguese setting, nine observations reveal that teachers know their students' names, and they try to know students' background. Then, in different activities, teachers try to divide them according to their learning styles and according to their learning abilities. When discussing about teaching aids, observations show that English language classes are predominantly speaking activities. Out of fifteen observations, four observations provide evidence of listening, i.e. CD player, while one teacher's class is always relaying on classroom projector.

Feedback: in all cases teachers have a very constructive feedback, whether it is immediate oral feedback or in the end of the class, students are able to understand what goes wrong and when and how to correct the mistake. When dealing with homework or written test, all teachers explain the abbreviationsthey use on papers on whiteboards firstly; then homework is given to the students. Students feel free to ask if something is not understood. (The written feedback is in different colors, usually red.)

In general, the observations show that students have opportunities to negotiate meaning and use everyday language rules. Teachers also try to provide the students with opportunities to obtain sufficient oral skills to develop their academic skills, i.e. their critical thinking skills. Students are encouraged and praised for their active participation; they can say what they want to say without being anxious that they would be scolded or offended if the answers are incorrect.

5 Kosovo – Students' interviews

Since this study is a comparison of ELT in HEI in two completely different European countries, one in the very western part of Europe-Portugal, and the other one in the east of Europe, it is of great importance to know what English both countries learn, alwaysbeing aware of different cultural and social backgrounds. In Kosovar aspect, General English in the first year is named as English 1. It involves one hundred and forty students in the first year, in a whole class, taught by teacher A for ninety minutes, while tutorial classes are divided in two smaller groups and taught by different teachers: teacher B and teacher C, (in one hundred and eighty minutes each tutorial class).

This study includes ten interviews with English Language and Literature students for English 1 classes. Based on the interviews, the overall discussion of the ELT system is as follows:

Relating to the English 1 level, the interviews reveal that teachers introduce different copies from various sources, focusing on ELL. Moreover, the interviews also reveal that ELL is considered as a demandedand challenging learning. Dialogues, discussions, opinions and decisions are activities in which Kosovar students are faced with in most of the teaching and learning time in English 1 classes. The teachers are facilitators who try to explain everything that the students consider difficultby keeping a balance of the working-up activities: group work, pair work, and whole class activities which are all well organized, and always showing competence (and authority, as three students mentioned).

Teachers explain difficult patterns to students, and they explain the new patterns until all the students are able to use those patterns fluently and freely. The teachers' encouragement in

participation, in collaboration, a pleasant relaxed atmosphere and the teachers moving around the class help students become more confident in English language usage. However, in Kosovar context, students' responses reveal that teachers do not show any effort to learn the students' names. Based on the students, it is noticed that different teaching approaches are applied; however, when discussing technology, the responses show that English language classes are mainly speaking activities and technology is rarely used.

CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

When discussing the adaption and modification of the curricula based on locally appropriate teaching and learning methods, the awareness of possible differences in both countries is an important factor. However, there is not such a huge difference between Portuguese and Kosovar tutorial ELT settings inHEIs.

The study considers that first year university students, who are usually eighteen years old in both institutions, have had English learning for many years, i.e. 10 or even 11 years of learning in the past, therefore, their English learning experience serves as a foundation for further teaching and learning, and this learning experience only supports PD of the teachers, i.e. FLT ability to further English learning. English language teaching models need adjustments which can be reached by possessing acceptable teaching/learning varieties. These varieties of ELT are based on the contemporary society needs and wishes, taking into accountthe place, country, culture, students' English language level and students' learning capabilities and styles.

When dealing witheach country's circumstances and ELT, the most problematic aspect from the study point of view is thelarge number of students in the groups. In addition to this, the response to the study query is as follows: Teaching circumstances in Kosovo, at the University of Prishtina, Department of English Languages and Literature, are more difficult than in Portuguese context. The large number of students, i.e. 35 in tutorial groups, is an alarming number that makes teaching and learning more difficult. However, despite these difficulties, teaching and learning in English 1 in Kosovo's institutionalized environment is a demandedactivity: The students are keen on ELL, although, unfortunately, the EPI 2016 does not show any specific international official ranking system that would rate Kosovar society's English skills.All in all, the students' responses and discussions show that in both cases, teachers have a very positive effect towards ELL regardless of the place. In addition to ELL and the extent of ELT differences in both countries, the study concludes that we cannot discuss about the differences in ELT without being aware of the countries' differences. Nevertheless, as the goals of CEFR/Bologna system/FLT curricula goals are more or less similar in each country, we cannot consider ELT in isolation. It is apparent that it is difficult to clearly separate ELT in both countries. In addition, knowing the fact that English language teaching cannot be invented, but it is a long process applied in different social phases and includes a bit of imitated teaching, the study also found some limitations: a)As it included higher education, one semester observation cannot be considered sufficient. Two completely different institutions need to be analyzed. b)The observations in in Portugal include classes with mobility students who may have different teaching background, i.e. their teaching/ learning background and this 'Portuguese' teaching/learning style might be different to

what they got used to in their countries. Thus, the study suggests that these students' responses might have somehow 'disbalanced' the findings of the observations. All in all, the study has just tackled some of the ELT aspects conducted in Portuguese learning environment, hoping to contribute to Kosovar higher educative system by reflecting the best EL teaching skills and the recommendation is given below:

For the sake of clearer CEFR ranking, the name of the subject English 1 should be changed into B2 English, followed by C1 and C2 English levels, adding sublevels within the semesters. When we consider the teaching material, the study recommends to the institutions to prepare their (Faculty) books/texts for each level, (suggesting books prepared from the topics that they are currently using in the teaching process); these books/texts would include appropriate global teaching topics that would fit to locally appropriate and applicable learning. They should be prepared after 'Needs Analyses', balancing students' needs, the Ministry of Education and its policy, and teachers' choice and students' opinions about the material to be used. These balancing factors are important factors for the learning material that should focus on communicative abilities, mainly focused on 'interculturality', 'multiculturality'and 'internationality'. They should also help self-learning, i.e. self-learning style and independence, followed by opportunities for student's rate and self-evaluation, aiming to more fluency and accuracy.Since PD in ELT context is crucial, the study recommends that each institution should participate in the international mobility exchange teaching programs. It should be 'a must' that every FL teacher visits an international institution. In this way,teachers can contribute to the host institution by applying new foreign teaching approaches, as well as teachers can observe and perceive other/international teaching styles. Being aware of the objectives of ELL and ELT in HEI, and in relation to the teaching/learning to various countries/universities, these exchange programs offer the HEI, teachers and students a concentration on the rates of English language progress. This also makes the study conclude thatthe effort teachers and students put into their English language studiesin 'glocal' aspect always contributes to balance global and local teaching and learning aspects by offering appropriately applicable approaches in FLT.

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IMPLEMENTING NEW APPROACHES IN CHEMISTRY TEACHING METHODS

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ABSTRACT: The aim of this paper is to develop new methodological approaches in chemistry education. The use of pictures, photos, diagrams, molecular models, and other kind of visualization tools has increased rapidly in the last years in chemistry education. In comparison to the traditional teaching methods where the board was the main tool, nowadays learning is towards utilizing Power Point presentations in lessons and learning the experimental part in the laboratory which is changed as well. The utilization of visual tools in chemistry education is required in terms to promote visualization capacities. Students can easily create imaginations on relations between macroscopic, microscopic and theoretical aspect. Connections between the practical, graphic and numeric aspect from the point of required outputs prove the learning content. Taking into account today's laboratories that have contemporary instruments, the teaching approaches should be developed in connection with visualization software packages. This is important in order to increase the performance ofthe teachers and to make students understand different topics in chemistry. The growing interest of educators in visual literacy is conditioned by the newly emerging communication and visualization technologies, which are supported by the development of computer graphics, animations, and simulations motion of the substances. The objective of this paper is to analyze these applications and evaluate them from the point of their further application in the chemistry instruction on the general knowledge of chemistry. The demonstration is not only applied to different concepts in chemistry education, but also to provide experience that allows students to have their own data and conclusions. In this research, the trial is to compare the effects of visual and experimental work in the laboratory towards students.

Keywords: Chemistry, education, Power Point, software

1 INTRODUCTION

Chemistry is a natural science that involves theoretical and experimental approach. The numerous tasks are good basis for preparing experiments. The understanding of this science is not only dependent on the conditions in certain in-

struction, but it is also linked to the teachers' attitudes to upgrade themselves in the direction to develop methods according to new trends in the education [1–4].

The main aim of the chemistry instructors (teachers) is to develop the contemporary methods in the educational process where the task of the student is to obtain well-organized knowledge of certain topic. The contemporary teaching is focusedonstudents, meaning that the student should be respected as a part of education and teachers should have commitment for well-organized classes. It is obvious that the teacher should be the master in his or her professional educative task. One of the roles of the teacher is giving support to all students. The way in which a chemistry lesson is presented is important as well. A chemistry teacher is not enough to possess knowledge to be successful in the profession. Two tasks are also dominant to be a good prepared teacher for getting positive results. The skill of teaching students and the love for obtaining knowledge are factors that are as important as being a good instructor of chemistry. The well-organized teacher should follow all students and determine any kind of problem in every moment [3,4].

The new trends in the education process are closely connected with the use of the facilities of internet technology and the chemistry software packages. Obtaining knowledge is not sufficient just for amoment, but it is a step by step process including many aspects such as getting theoretical and experimental ways of understanding the principles of the subject [5].

Many students are faced with difficulties when they start learning chemistry. As a science, chemistry is connected with other sciences and it should be studied in continuum. All structural formulas, symbols, and representation of chemical reactions are introduced to help students to study better chemistry disciplines. It is worth to mention that dealing with such subject, one of the most important habits that students should practice is to prepare experiments in laboratoryindividually. Nowadays, there are many illustrative pictures showing 2D or even 3D presentations of the atoms in molecules which are made in such a way to improve the visualization abilities of the students [1,6]. Although the literature gives good examples of 2D and achieving with shadows 3D of the molecules, the rotation of the molecules in order to get better presentation of the molecules is achieved using specialized chemistry software packages [6].

Considering the lack of numerous literature data related to the interactive teaching methods in chemistry, a study was necessary to conduct. The aim of this work is to give general comparison of the most common interactive teaching methods such as demonstration, brainstorming, work in groups, and also to use visual effects in the implementation oftheoretical and experimental work inchemistry. Students are expected to improve experimental work and to develop motor skills.

2 THEORETICAL AND EXPERIMENTAL APPROACHES IN TEACHING CHEMISTRY

2.1 Theoretical principles in modern teaching

Comparing the traditional teaching where chalk and board were the main tools in the teaching, today's classroomsareequipped with internet technology where the use of Power Point presentations stimulate students to focus better in the class [7, 8]. They have even their own computers where they can test the theoretical ways of teaching in real time. The chemistry software is important in many exercises in subjects which are part of chemistry, such as stereochemistry, biochemistry, theoretical organic chemistry and crystal chemistry where students can obtain better view of the 3D structures. They can understand how the microscopic world with certain approximation works and they can make experiments on the computer [6]. This gives a great opportunity for

young researchers to see how much substances are needed for one experiment and how to set a good experimental approach. This approach of learning chemistry is important in order to retain the obtained knowledge for a long time.

Many calculations can be done with advanced software packages which can help avoiding toxic reagents and can be less time-consuming for the experiments in the laboratory. Moreover, certain substances have two forms, such as isomers and the use of chemistry software packages help students to separate the forms and simultaneously determine which one will have more beneficial effects in biochemistry, pharmacy or in the laboratory for specific experiments.

One of the most characteristic ways to improve studying is to involve visual effects in teaching [5]. The visualization is of high importance in chemistry subjects because of reactions where indicators are involved, such as acid-base titration reactions, while the view of the colour is a crucial factor to know how to determine the substances in the analyte. The posters, illustrations and even the lessons which are written on the white board should be with certain colour (all acids should be written with red, all bases with blue and salts with green markers). The types of students who learn better with illustrations are expected to have better view and can memorize with ease structural formulas when they are written with one specific colour. On the other hand, students who are better listeners should recall the structures with certain sound.

The trend in the contemporary education is to make all activities creative and also linked with the interests of the students. In comparison to the traditional teaching where the teacher was the primary figure in the class, the modern way ofteaching is inventing methods on how to help students to best fit in the learning processbecause they are also part ofthe educational process [5].

The most common methods for successful interactive learning are presented in Fig.1.

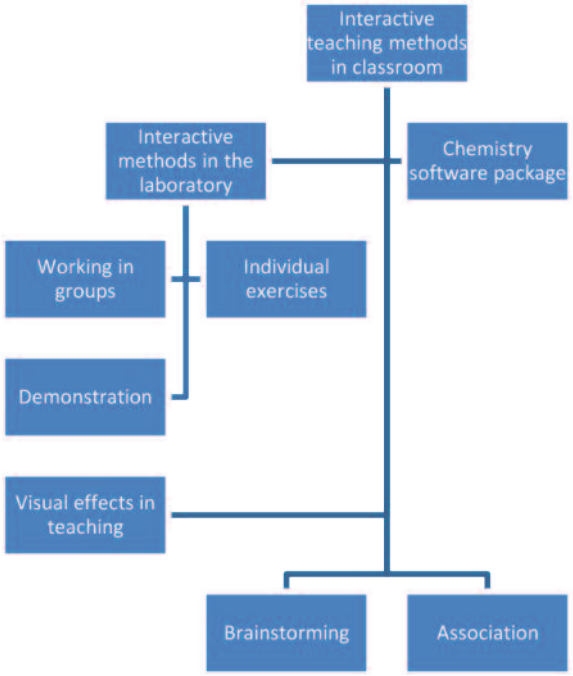

Fig. 1. Interactive teaching methods in chemistry.

Brainstorming. The ideas can be presented either by students individually or by a group of students. The main advantage in this method is the combination of ideas and alsohaving a balanced output idea between quantitative and qualitative information.

Working in groups. Most activities are divided between the participants in the exercises. Students can share their own attitudes and learn how to communicate for a certain topic in chemistry. In this form of teaching, students can present their own ideas and can also accept the suggestions of the other colleagues.

Individual exercises. The individual exercises are introduced to recognize the level of the knowledge that is showed by every student. Students can follow their own stepsduring their work. The teacher can observethe progress of the students with ease in continuous period.

Demonstration. The focus of this method is to upgrade the knowledge of the students. The method itself is created to support students to try to make progress in the exercises with suitable guidelines from the teacher. This form of teaching

is widely used in laboratory exercises where teachers show how to conduct experiments.

Association. The terminology in chemistry can be learnt easily with the use of visual effects in teaching such as pictures and linking words with the topic of chemistry. The implementation of chemistry software packages in exercises is to encourage students not only to use modern technology but also to solve tasks in chemistry.

2.2 Experimental basis in contemporary chemistry teaching

The basisof implementation of new teaching methods in the laboratory is towards the knowledge on how to protect students during experiments. Students should know how to distinguish one substance from the other and know how they should behave if the experiment goes wrong. Teaching chemistry in a laboratory is a specific profession where students should take care for all equipment in the laboratory,whetherit is a part of the laboratory equipment, such as glass or porcelain, or it is part of the informatics, such as a computer.

The idea of implementingnew teaching methods is related to the movement of the teacher's focuson students. The trends in the experimental approaches are in the direction of giving real analyte to the student and to leave him or her alone in order to make a plan on how to solve the task. In comparison with the older methods, it is worth to notice that the didactic approach should be kept in means that the idea should be developed from an easy to a complex step, from a determined concept to an abstract level. The new approach in the method is that students should know that they are not alone, that the teacher is always there for them, but the position of the teacher will change from time to time. Teachers will leave students solve problems in chemistry and young researchers should obtain confidence in the experiment when they are preparing it. They should be conscious of what they make and know all the tasks of the problem that is set. Young students should be able to face real problems and they should solve tasks without difficulties. In order to achieve this, the laboratory should be well-equipped with contemporary instruments, internet technology and it should be well-organized in order to achieve efficiency in learning chemistry.

Although most of the experiments are begun in the test tube, students should keep in mind that they need to be patient and manage to deal at the same time with complex chemistry problems with the use of modern instrumentations such as chromatographic, NMR or IR. They should be able to make links between theoretical and experimental approaches and to analyze the analyte with the gained knowledge. In addition, students should learn that the laboratory is not a dangerous place, but certain precautions should be takeninto account when they work in it.

3 RESULTS AND DISCUSSION

A group of students (n = 10) at the age between 18 and 20 years were tested using interactive methods in teaching during the class. The data of the tests were gained fromqualitative analysis to see how the interactive methods in teaching influenced the study process of students.

At the beginning, students only knew that they should overcome some difficulties in studying chemistry. During the experiment, students paid attention on the instructions of the teachers. The teachers followed the work of the students and the results they achieved during the exams.

The results showed that students accepted new approaches in teaching due to the connection along with the modern technology using accessible tools such as chemistry software packages and internet technology. The implementation of new interactive methods in chemistry helped students organize themselves better in the laboratory. They were more confident in their own results and wanted to learn more, despite ofthe difficult

taskof thechemistry exercise. According to the students, one of the best ways to memorize was to draw the complex apparatus or schematic representation of the methods and techniques, or to set some visual presentations in front of them.

The visualization effects including pictures, photos, diagrams, molecular models andPower Point presentations are required to promote the visualization capacities of students. There are various types of learning and students can learn quickly with sounds, with pictures or with a combination of sounds and pictures. The modern technology provided every student to find the best way on how to learn better and to be successful in the work. All those various tasks which were asked from the students by the instructors (teachers) were better prepared with up to 75% with the use of posters, chemistry games and models of substances.

Some of the interactive methods and techniques, such as demonstration and work in pairs, were accepted from the students very well. The method of demonstration helped students to be more patient in the further trials of experimentsand also know how to upgrade their practical knowledge with ease. In the questionnaire, students showed affinity in working in groups due to the ability ofthe method to exchange their own ideas. The method also gave opportunities to students on how to express their opinion pro or against another view. The communication between the students at same age was important in order to know what and how to formulate arguments for chemistry topic. Moreover, this method included separated tasks which are linked to give the whole idea of individual exercises. Students can be original and creative in their presentation of the task and compete with other groups with the same or with different topic of chemistry.

4 CONCLUSIONS

The sustainability of chemistry as a science is to make bridges between the traditional habits and modern ways of teaching. This means that the tasks of the teaching process should always contain educational factor in order to obtain knowledge and to have functional dimensional, as well. Chemistry should be focused towards the students in order to understand the subject and obtain better results. The visual effects and the use of chemistry software packages help students solve tasks in chemistry. The results showed that the capacities of the students were strengthened by making chemistry a subject where they can feel comfortable to express their own ideas, to have their own results and to learn more effectively.

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SOLVING REAL-LIFE PROBLEMS FOR INCREASING THE MOTIVATION OF LEARNING MATH

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ABSTRACT:One of the priorities of the European education and in our country in general is increasing the knowledge of students in Mathematics. Students use computers, mobile phones and other devices to satisfy their everyday needs. If we manage to encourage students and motivate them to use these electronic devices for testing, research and solving problems which they encounter in everyday situations, they can be motivated to learn mathematics and at the same time their level of knowledge will be increased.

For this purpose, there is an interactive book Math Labyrinth developed on a website http://math-labyrinth.azurewebsites.net.

The problems uploaded on the website are in accordance with the contents and topics covered in the curricula for secondary education and in relation toeveryday situations. These problems require knowledge in mathematics in order to be solved. After reading and understanding the problem, if the student knows the procedure for solving, he/she will begin doing the task. They will also be able to check whether the answers are identical to the given solution. If the students experience some difficulties, they can look at the provided applets that enable visualization of the problems and then choose a path with steps and hints. By going through the given path that explains the procedure and using ICT, the student can come to the solution by himself.

Keywords: Mathematics, motivation, website, problems, ICT.

1 INTRODUCTION

In several latest researches that have been done in our country, and wider, it has been established that the knowledge in mathematics and the pupils` motivation for studying mathematics are reduced and they are below the minimum level of knowledge. Thus, one of the priorities of our country and wider in the field of education is to motivate the pupils to study mathematics and to increase the level of knowledge in the same subject with the pupils of all ages.

How to increase the level of knowledge in mathematics and how to increase the motivation for studying mathematics?

Because the pupils use computers, smart phones and other electronic devices for their needs more and more, there is a need to incorporate them in the education and in the studying of mathematics. The free software (GeoGebra) is used in the teaching, which is used to solve and visualize the constructive exercises [1], exercises with functions, exercises from plane geometry and solid geometry, exercises with probability and others. Using the software class marker there have been made electronic tests to test the pupils` knowledge [2], which are quite positively accepted by them. However, IT is not used enough in the teaching and it is still necessary to work on raising the pupils` motivation and their level of knowledge.

In order to establish the benefits of the use of

the web application in teaching mathematics and increasing the motivation, and by doing that increasing the knowledge in mathematics too, an online platform has been made http://mathlabyrinth.azurewebsites.net [3] with textual tasks which process real life problems. Pupils can use this platform for resolving the tasks on classes or for homework.

2 THE METHODOLOGY FOR MAKING TEXTUAL EXERCISES FROM THE WEB APPLICATION

Before starting to make the web application, it was necessary to choose the exercises and a procedure for their solving. The exercises that are presented on the web site are from the text books which are used in our country or for international tests and are related to everyday problems which the pupils can encounter. The exercises are grouped by themes (Fig. 1).

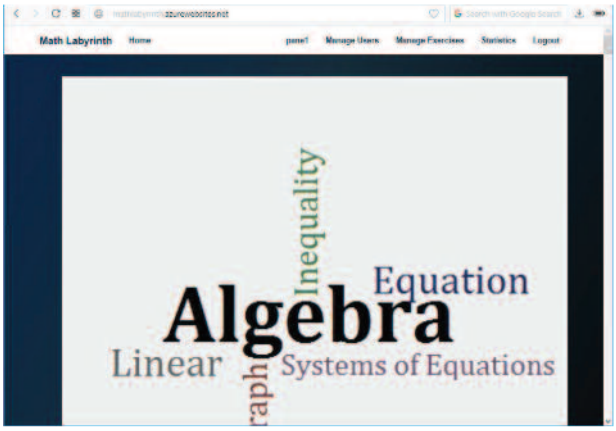


Fig. 1. Home page – Themes.

While determining the procedure for solving exercises, knowing that they will be solved during lessons and in domestic conditions, a procedure based on Pólya presented in the book "How to solve" has been used [4].

The procedure is based on four principles and they are:

First, understanding the problem,

After understanding you make a plan for solving,

Implementation of the plan,

To look at the procedure and the problem solving. Can it be improved and how?

The first principle – Understanding the problem

"Understanding the problem" is often neglected, as if it is apparent, so it isevennot mentioned during the mathematics lessons. However, pupils are often stuck in this step, when they want to solve the exercise alone, simply because they do not fully understand the given problem. In order to fix this sight, Pólya gives instructions on how teachers can encourage pupils, with appropriate questions, depending on the situation, such as: "What needs to be found or shown? Can you repeat the problem in your own words? Can you make a drawing or a diagram which will help you understanding the problem? Do you understand all the words which are used in the problem presentation?" Thus, at the beginning of the exercise, which is presented on the web site, the teacher chooses a couple questions with appropriate level of difficulty depending on the age of the pupils, in order to understand the exercise and know what needs to be calculated.

The second principle – make a plan

According to Pólya, it hasbeen mentioned that there are many reasonable ways for problems solving. The skill of choosing the appropriate strategy can be learnt best by solving many problems and this should be highlighted to the pupils. A partial list of strategies is: guess and check, elimination of possibilities, use of symmetry, think of different cases, use direct thinking and solve equations.

A concrete list of strategies is: look for a model, draw a picture, use a formula, be creative, use skills and so on.

In the process of choosing the plan and procedure for solving the exercise it is used a free software for visualization of the problems and presentation of different procedures for their solving. It is always mentioned that this is one of the

procedures for solving the exercise, that with the pupils` creativity the exercise can be solved differently and much faster.

The third principle – Implementation of the plan

This step is usually easier than making the plan. In fact, all you need is care and patience, considering that they have the necessaryskills. They should continue with the chosen plan. The author of this step mentions that'if it doesn`t work, throw it away and choose another plan. Don`t fool yourself; this is the principle how the mathematics is done, even by the professionals.'

In this part, the teacher describes the steps for the calculation of the exercise solution in details. He or she encourages the pupils that with this procedure the problem can be solved. But if they try some other way to solve the problem and it does not work, they should throw that plan away and try a new one, without losing hope in the process of the problem solving.

The forth principle – Check/ widen.

Pólya mentions that it can be achieved a lot if you take your time to think and look back to what you have done, the things that you have done and the ones you havenot. That will allow you to see what strategy to use to solve problems in the future, if they are related to the original problem.

Inthe end, the teacher congratulates them for the successfully finished work and he/she encourages them to use these principles while solving the other exercises. If they have some new solution and thinking, they should presentit to the teacher so that it can be published and shared with the other pupils.

3 IMPLEMENTATION OF WEB APPLICATION

By using these principles, a web application "Math labyrinth" has been made, where textual exercises related to the real life are set [3].

For each exercise which is set on the web application there is a preparation using the principles of Pólya. (Fig. 2)

area/topic/subject – **Probability**

Problem - 14

Two friends A and B have agreed to meet in the city center of Skopje from 12 to 13 hours.

To determine the probability that the two friends will meet if each of them after the arrival at the meeting, waits 10 minutes the other friend to come, and if does not come to the meeting - leaves.

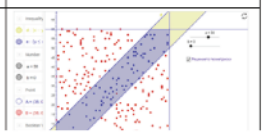
Steps/Stages	Help/hints	Answer/solution
How to mark the time when the friends will arrive in the square?	Using variables. The hour will be 12, plus the minutes, so we will just mark the minutes. For example: if the friend A arrived at 12 o'clock and 20 minutes we will write down only that that is 20 minutes the time of arrival.	Let's mark the time of arrival in minutes of the friend A with "x", and the time of arrival of the friend B with "y".
In which limits the variables are ranging?		$0 \leq x \leq 60$ and $0 \leq y \leq 60$
How to mark together the arrival time of the both friends?		Using a point S with coordinates x and y. Or: $S(x,y)$
Look at the applet of the problem.	Try to prepare.	

Fig. 2. An example of a ready task.

You can set the exercises by signing the web site as an administrator (teacher). The main menu contains Math Labyrinth-Home, Manage Users, Manage Exercises and Statistics.

Way of setting the exercises

By choosing the option Manage Exercises, the fields for entering the exercise are opened.In the field Exercise Description, the text of the exercise should be entered, in the field Exercise Name the title of the exercise should be put, and in the field Exercise Topic, from the dropping menu, the theme of the exercise should be chosen (Fig. 3).

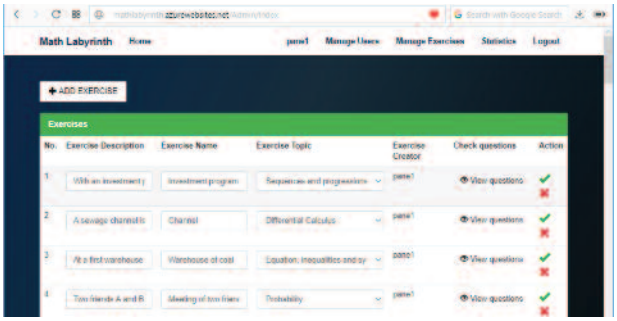


Fig. 3. Manage Exercises

By clicking on View question, you go to the next window where you write Question, Help, Answer and Additional. In each field you can add text or a file by choosing one of the buttons Add/Edit text or Add/Edit file. In the field Question, you write

the question in Latex. In Help you add some kind of help for the question in order to get to the answer. In Answer you write the answer of the question, picture or link to some applet which is related to the answer. In Additional you add the additional information about the applet construction, the construction of the picture or some other additional information which can be used by the pupils while solving the exercises (Fig.4).

In the field Order in Flow you choose the ordinal number of the question in the exercise and at the end it is recorded.

Fig. 4. View question

After you enter all the questions and the answer, we go back to the home page and the whole exercise is recorded again.

This is the way in which all exercises are set on the web application.

How will the pupils use the web application?

By signing the web application as a pupil, each pupil can use the given exercises. The main menu contains: Math Labyrinth Home and Logout (Fig.5).

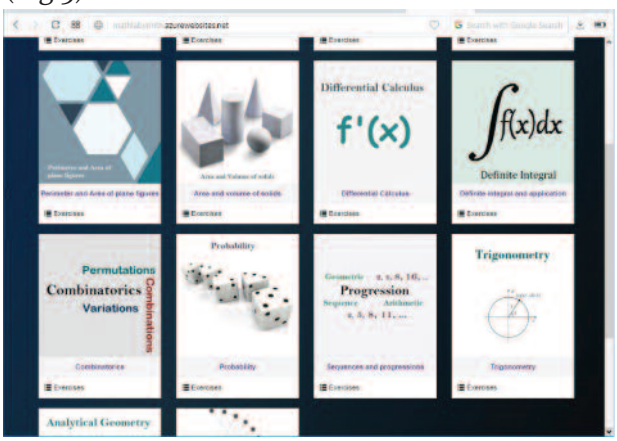


Fig. 5. Home – student

In Home all themes are set. By choosing a theme you go to the exercises which are set in that topic. The pupil can read the titles of the exercises and their content. If the pupil wants to solve some exercise and see what is thesolution, he/she clicks the button Play in order to begin with the exercise; in other words, to start with “the game” in Math Labyrinth. The steps for solving are set in a form of labyrinth, and that`s why the entire application is called Math Labyrinth.

By clicking the button Play you begin the procedure for solving the exercise. First, you open one window in which you can see the principles of Pólya written and then you choose the work model of the exercise: Test mode- if you only want to use the questions and the help for getting to the solution of the exercise;in other words, it only tests you if you can get to the solution, or Practice mode- if you want to use the questions, the help and the answers for each question, which will lead to the solution of the exercise (Fig.6).

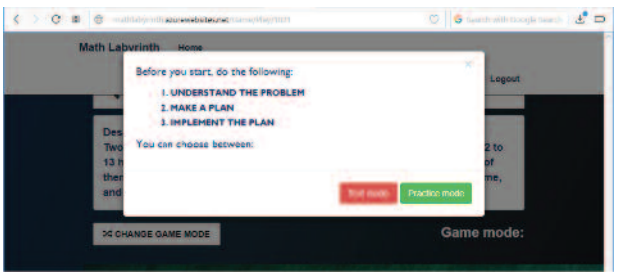


Fig. 6. Test mode and Practice mode

By choosing themode for solving the exercise, a window is openedin which the labyrinth is set and by clicking the button number 1 you begin the procedure of presenting the exercise (Fig.7).

Fig. 7. Math Labyrinth

In each step there is only one question which needs to be answered by the pupil, or some picture or link to an applet where the pupil should go in order to see the visualization of the exercise or the solution (Fig.8).

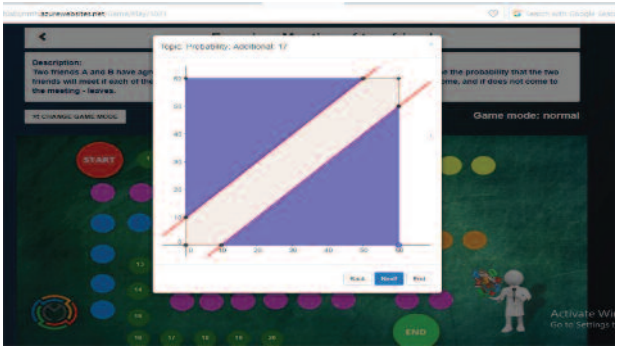


Fig. 8. Steps in solving the task.

After finishing the procedure for solving the exercise, orfinishingall foreseen steps by the teacher, the pupil gets the solution, and then a window in which congratulations is written is also opened. Furthermore, it encourages the pupil to try independent solving for the remaining exercises.

4 USE OF THE WEB APPLICATION

If we are signed as Super Admin, in the space for Statistics we can see how many users are registered on the site, how many of them are pupils and how many are teachers.

During the test period, this web site was used by 20 teachers and they all have positive opinionabout it, for the way of presenting the exercises and the use of the web site.

In the first year, 130 pupils were registered as users of this web site.

The teacher can see which pupils have used this site so far, how long were they on the site and which exercises they solved completely.

5 CONCLUSION

By using the web application and IT in the math teaching, while solving exercises and their visualization, the motivation of the pupils from the Gymnasium for studying mathematics has been increased. A lot of pupils are satisfied that they get to the solution of the exercises in domestic conditions with the help of the visualization and the help of the website.

Thus, we encourage you to use this application and other web applications or free software while solving math problems, because we will have pupils who will be motivated to study mathematics and achieve better results.

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ANALYSES OF ICT USAGE IN SCHOOL MANAGEMENT IN MACEDONIA

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ABSTRACT:The focus of the research study is to investigate and analyze the ICT usage in School Management. ICT in teaching has an important role and its impact on the advancement of educational processes related to effective teaching and learning, and modern research in this field is almost irreplaceable. Another important element is the use of different software platforms that facilitate visible learning and make it more concrete, more practical and applicable to everyday life. Of course, the use of ICT in teaching practices cannot be imagined without the continuous professional development of teachers, to increase competence in the use of ICT and global tracking technological innovation in the field of education. In order to analyze the data, a combination of qualitative and quantitative methodology has been used. In order to collect the data, a questionnaire has been used. Insights and recommendations are provided, argumented and discussed.

Keywords: ICT usage in schools, management of education, evaluation of technology enhanced education.

1 INTRODUCTION

Information and communication technology represents one of the main areas in contemporary human life.In teaching it is an integral part of our-daily activity and paves the way to deal with the problems of the present and the future. Information technology and communication is a continuation and extension of previous knowledge in this field and it has to do with the acquisition of thenecessary knowledge and skills for successful and independent use of the hardware information technology and communication (ICT), the use of respective programs that can be edited, created, designed, and published web pages with various data via internet (Brooker, 2003)

Through these web pages, we aim to provide examples of different learning ways and that these examples help teachers' explanations for students' learning through practical examples and easier to understand, and to become familiar with many more subjects.

In higher education, information and communication technology has enabled the lectures,

seminars and various presentations, exams etc., to be held in the form of the so-called "online" form, despite the remoteness of the facility, i.e. there is no reason to justify ourselves for the long-distance educational institutions, so the only condition to be fulfilled is to have communication infrastructure that is appropriate for internet and communication programs.

The use of websites being implemented in all the vital processes is vital necessity for the development of knowledge worldwide. Even in the sphere of education, as in every area of life, the use of websites has brought about a radical turn in the development of the culture of learning, making knowledge more advanced and more accessible, develop skills and have conceptual and perceptual students during classes and facilitate learning.

All this enables the progress for independent development, brings dynamism in teaching/learning, promotes and develops training for communication, mathematics, foreign languages, social studies, programming, design, critical thinking and solving problems of different nature, using multiple sources etc., for all students.

New technologies are constantly arising and they influence the way how people interact and learn. Recent developments in digital technologies, especially web 2.0 tools such as blogs, wikis and social media, and mobile devices such as smartphones and tablets, have given the end user, the learner, much more control over access to and the creation and sharing of knowledge. This empowers learners, and innovative instructors are finding ways to leverage this learner control to increase motivation and relevance for learners.

2 LITERATURE REVIEW

This current literature review provides an indication as to the research available in this field, identifies some key documents and emerging messages, and suggest priority areas for future research.

Key emerging messages include the following: the importance of ICT to society and to future prospects is clear within the educational literature, but the real significance of this for educational management has yet to be seen within the literature. A Web quest, "according to Bernie Dodge, author of the WebQuest concept," is an activity-oriented in which most or all of the information used by learners is drawn from the web. Web quest are designed for use in leisure, focus on using information rather than looking for it, and to support students in thinking at the levels of analysis, synthesis and evaluation (Condie, et al 2007).

Web Questa are simple websites, where they can be built with any software that allows to create websites. Users of information and communication technology can develop code in Notepad or Notepad ++ which is the most advanced, while used templates are offered through, e.g. Microsoft Platform or OpenOffice. There are more advanced developing Web softwares, but the most well-known are Dreamweaver, FrontPage, etc.

There are pages of various websites that are geared specifically to enable the creation of web Questa, as Questgarden, Zunal, Teacherweb, etc. All these allow the teacher to create and modify those for the student to be more understood. These websites offer less control over the design, but they make the creation process simpler and more direct.

The methods for creating web Questa are easier than it is thought, so we are always looking to make a web quest but we are not sure where to start. Therefore, the use of information technology and communication has concrete answers and can make the process easier for the activity in question. Web quest are probably the most talked-about activities and widely used web-based nowadays, which are used for constructive approach to learning and a deeper knowledge of specific topics. Through the use of web Questa, students are not limited to learning only from

books, brochures, magazines, etc.Hence, students would benefit and also use their imagination to solve various detected problems or establishan easy method to use. So, the creation and completion of a Web-questis a very effective way forstudents touse the computer. This includes strengthening the two forms and more powerful electronic tools that werecently have: the Internet and related programs. WebQuest is a demanding task for which an online material should be used and other materials as well. Each student has one or more roles and have to use the language constantly during the operation of the task (Mazrek, 2015).

Communication, teamwork, problem solving, critical skills and creative thinking are becoming more important in today's world than having students who learn by heart the default content.

Web Questa allows students to seek and find what there is in the subject and enrich any elements forthat topic that will be beneficial, to do more than learning information by heart, but meaningful. Here, teachers can express their ability to make changes in the curriculum to accommodate different needs that students understand and remember for a long time.

Distinctive features - Web Questa distinguishesthree features, such as:

• Web Questiis class-based

• Web Questiemphasizes their thinking (such as analysis, criticism,creativityor similar)

• The teacher selects the appropriate resources, by emphasizing the use of information

The purpose of the Web Questa group work is accomplished by dividing the roles and tasks.

Web Questa tasks - their duty is to havea description of what will be introduced in Web Quest.

Process –it shows the steps of the processes through which we have has passed to achieve successful introduction of adequate material and examples.

Resources - in order to provide a better presentation of the Web Questa, we should take into account other sources.

Evaluation - ways of presenting Web Questa to students for specific projects that will be evaluated, their preparation and presentation must be fair, clear, consistent, comprehensive and specific for certain tasks adequately.

Questa uses the web in education - teachers use web Questa for:

• Keeping children active fora certain time using the Internet (student activities organized by Questi web and they can stay focused on the use of information rather than find it),

• Making students think in a higher level of analysis, synthesis and evaluation,

• Critical thinking and problem solving through authentic assessment, learning group,

• Motivating students to learn independently,

• Familiarity with technological components,

• Provision of guidance, through which solved problems and ideas arise for the use of other resources to better understanding,

• Increasing the skills and the development of thinking, etc.

BLOG is the acronym of "WEB" and "LOG". Blog is a website which is maintained by a person who continually enriches with different information on the subject which elaborates. Information that can be edited are different formats like text, pictures, audio, video, etc., where the content of the information is displayed in chronological order form. In Information Technology, blog makes one of the most common forms for the preparation of websites nowadays, relying on methods of creating BLOGs and maintenance.Maintenance is easy and does not requires a deep knowledge of ICT.Viewed from a practical perspective, blogs area personal online diary where teachers can write on topics that have to be explained to students,and bloggers threads (teachers) can be varied and rich with examples.Web journals deal with one or more subjects in which visitors can write commentaries or ask questions. Each can,

in a simple way and without any special technical knowledge,show their opinion. The contents change frequently and this makes the web more popular than journals (Duhaney, 2001).

In addition, a BLOG can be seen in the format of micro blogging by posting on social networks: Facebook, Twitter, Video Blogging etc.

3 RESEARCH METHODOLOGY

The research methodology uses quantitative research. Primary quantitative data has been mainly collected from questionnaires, particularly designed for this research, which has been distributed to the management and administration of school institution.

The target group were teachers and students of 2 (two) schools.

The research methodology is based on the questionnaire instrument, which has been distributed to educational institutions in the municipality of Skopje.

The questionnaire consisted of 11 questions, where: 3 questions consistedof basic information and other questions have been distributed for assessing the specific impacting factors.

4 RESULTS AND DISCUSSION

There were 39 responses from the participants in the questionnaire that had 11 questions and an option for additional comments thataddressed the main identified issues regarding e-learning. Each question indicates the ICT usage in schools. As a case study,two schools have been chosen: ArseniJovkov(48.7%) and Zef Lush Marku (51.3%).

Access to computers - Based on the results presented from the survey, it results that all schools are equipped with computers, which is a very important indication on the one hand, and a disturbing indicator on the other hand, since the level of their use is very low.

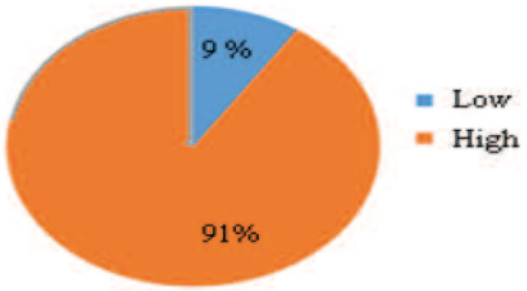

Fig. 1. Analyses of Access to Computers.

The long experience as Director withcomputer possession, following some training in technology, is inconsistent with the level of the full use of technology for the management and creation of climate use in schools.

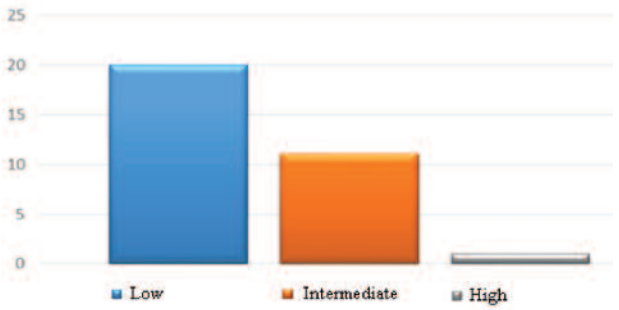

Fig. 2. Analyses of Computer Skills level.

Computer skills - 63% of directors have little knowledge in the use of technology, despite the fact that all possessed a computer, 34% and 3% average knowledge of enjoyable knowledge. The following image is reflected in the rate of computer ownership by directors.

Website - 50% of those who are beginners in the use of the Internet is alarming, because all communication nowadays is oriented towards and through Internet technologies. Everything in the world of technology today is preceded by communication via the Internet. The development and advancement of all processes that occur in schoolsdependent primarily oncommunication through internet technologies.

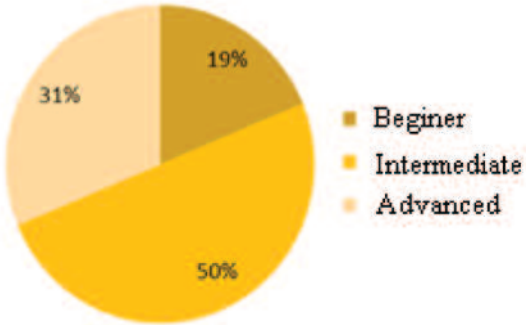

Fig. 3. Analyses of Internet usage.

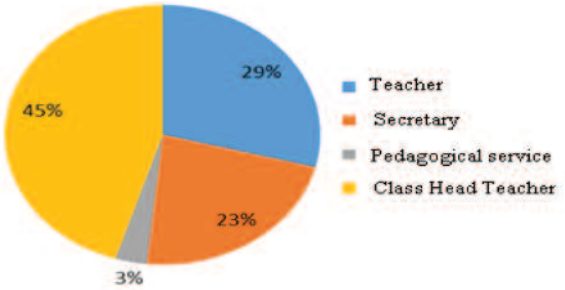

Fig. 5. Analyses of Daily Reports.

Reports - 91% of electronic reporting is inconsistent with the computer skills of directors. This percentage is due to the staff-engaged by the directors to prepare reports electronically.

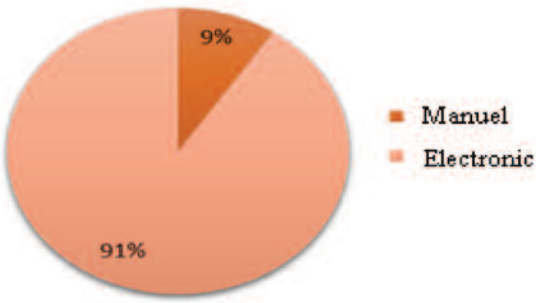

Fig. 4. Analyses of Reporting.

Compiler reports - Directors hire teachers for the preparation of reports. This result makesus realize even one of the reasons why the level of technology use is low, so they are upheld to their subordinates and this did not make them to engage and commit themselves more in the use of technology, given the fact that they have the legal obligations which sets out the duties of school principals, as e.g. management database of theschool, reporting through EMIS 1 -s, statistical reports, descriptive, analytical etc. The figure shown on the next page presents the rate makers electronic reports.

Delays reports– Clearly, not the best approach to technology can affectdelayed reports. These delays cause reporting problems because they know that these reports have their hierarchy of school - Education - Director - Minister.

5 CONCLUSIONS

In summary, we have performed both an experimental and theoretical study of the analyses of ICT usage in School Management in Macedonia and as case study analyzed two high schools,ArseniJovkov(48.7%) and Zef Lush Marku. (51.3%).

The importance of ICT to society and to future prospects is clear within the educational literature.

Information and communication technology knows no tradition but innovation and innovation. Therefore, the use of the benefits offered by technology in teaching will affect students to learn and achieve more objectives of the course and quickly learn through attractive examples that teacherspresent on various subjects, compared with traditional methods and tools.

With the use of technology which is understood as the implementation of equipment and various tools in the learning processes, not only students will benefit more and prepare better for the future, but it is welcomed and makes it easier for teachers in communication, critical thinking and problem solving, as well as organizing various working groups that are essential nowadaysto achieve more than just reading or writing.

The necessity of the use of technology in all aspects and levels of education starting from the fact of the generations before preparing to become familiar with the technology and to achieve success in all areasof life day by day is led

by information.

The need and reason of the application of ICT in education starting from the fact of preparing young people to become leaders and be successful in this society is led by information. Communication skills, processing, critical thinking,problem solving and group work are essential to society and socio-economic technology. The 21st Century Education in this sophisticated environment will do more than just reading, writing or acquisition of skills arithmetic. It should also provide job skills that will help young people achieve their human potential.

Therefore, information and communication technology in education that will address the changes and effects in primary education are: emphasis on the demands, the way of more effective integration of ICT in teaching methods changing from traditional to interactive, lessonswith the evolution of the ICT applications, electronic data processing and data interpretation.

ICT integration is not only an opportunity but also a necessity to make the educational process more attractive. (Mazrek, 2015).The main goal is to use the benefits offered by technology to optimize their use by various categories of potential participants as teachers, students, etc., which represents a very challengingstep, especially in the low cycle in primary schools where learning content must have elements that for the students will be reasonable and enforceable.

Each school precedes development using technology and communication in all areas and communities. The opportunities offered by communication technology are multi-dimensional and more efficient. The possibility of cooperation between schools, whether urban or rural, regional, or global by using the technology would bring more good schools and various processes to advance in school. Using the opportunities that technology give will help the triangleparent-school-community, business community, etc. By using the opportunities that technology offers, the school division will bring experience, professional development through online courses, video conferences, project management school, school timetables, efficient management, monitoring and effective supervision, various development activities, educational creativity and innovation, problem solving, communication and mutual cooperation between teachers - students, etc.

Relying on technology developments downturn, education should be a vital aspect in the learning process. Technology can affect learning in education in different ways:

• Changing the orientation of the education system, where teachers arethe source of knowledge for students,

• The choice of many valuable and usable resources by students,

• The possibility of distance learning (e-learning),

• The standardization of quality in education,

• The need to better understand and implement lifelong education, etc.

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SUSTAINABLE GREEN NETWORKING AND COMPUTING IN 5G SYSTEMS: TECHNOLOGY, ECONOMICS AND DEPLOYMENT

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ABSTRACT: Today the whole world is faced with economic and social challenges such as ageing of populations, social cohesion, sustainable development, etc. In 2015, the United Nations established new global sustainable development goals which would protect the planet from degradation, such as sustainable consumption and production, sustainable management of its natural resources and taking urgent action on climate change, in order to support the needs of present and future generations. Achieving the sustainable development goals demands new technologies, innovations, and data collection that can integrate and complement traditional statistics. A driving force behind this data revolution is the mobile technology. In this direction many research initiatives are currently working on the next 5th generation of mobile and wireless networks, usually referred to as 5G. One of the most critical challenges in the design and deployment of the 5G system is the development of green and sustainable networking and computing protocols that are capable of supporting the advocated 1000 times data rates and throughput with a reasonable and affordable energy consumption level. This paper explores the ways in which 5G network technology would enable public protection, resource management, and overall sustainability. The evaluation of sustainable green networking in 5G and computing is performed through the energy efficiency, a very important parameter used to evaluate the ecological goals and the economics of the network. The results clearly demonstrate that 5G together with cloud and fog computing environment is a promising solution to provide a technological sustainability.

Keywords: 5G, cloud computing, energy efficiency, fog computing, green networking, sustainability.

1 INTRODUCTION

Today we live in a modern developed world where we consume a lot of natural resources every day. However, the overuse of the natural resources could lead to a degradation of our environment, or even the whole planet. There are many examples throughout human history where a civilization has damaged its own environment and seriously affected its own survival chances [1].

Therefore, it is very important to manage to protect our natural environment, human and ecological health, while driving innovation and not compromising our way of life. Recently,it appeared a new study field, **Sustainability**, that studies how natural systems function, remain diverse and produce everything that is necessary for the ecology to remain in balance. Sustainability tries to bridge social science with civic engineering and environmental science with the technology of the future in order to provide sustainable development [2].

In 2015, the United Nations established new global sustainable development goals in order to protect the planet from degradation. Achieving

these sustainable development goals demands new technologies, innovations, and data collection that can integrate and complement traditional statistics [3].

A driving force behind this data revolution is the Mobile Technology. In this direction, many research initiatives are currently working on the next generation of mobile and wireless systems and networks, known as 5G, which isexpected to be deployed around 2020 [4]. One of the most critical challenges in the design and deployment of the 5G system is the development of green and sustainable networking and computing protocols that are capable of supporting the advocated 1000 times data rates and throughput with a reasonable and affordable energy consumption level [5], [6].

This paper is about the sustainable green networking in 5G systems. In this direction, it discusses the 5G technology that would provide sustainable green networking. Then,the sustainability of 5G is explored through the energy efficiency, a parameter which is closely related with the economics of 5G. Finally, at the end the concluding remarksare provided.

2 THREE IMPORTANT PILARS FOR SUSTAINABLE DEVELOPMENT

Sustainable development is a multidimensional concept aimed at equally environmental components in sustainable consumption of natural resources, protection of environment factors, health care for population, the social side by equality, quality of life and stopping poverty and economy by increasing sustainable [7]. All these are equal parts of the new development, whose objectives were set out along time in documents on the topic sustainable development.

Fig. 1.Sustainable Development Pillars.

As it is shown in Fig. 1, a sustainable system consists of three important pillars or components: economic development, social development and environmental protection which are used in connection with human and natural systems [7]. These components must be regarded as a whole, and any components should not be given more or less importance than others. The well-being of these components is intertwined.

The economic development should provide to the people what they want without compromising the quality of life, especially in the developing world, and reducing the financial burden of doing the right thing.

Social development is primarily focused on the awareness of and legislation protection of the health of people from pollution and other harmful activities of businesses and other organizations. Social development is also focused on sustainable housing, i.e. how people build the homes they live in from a sustainable material. Finally, education is also important here which teaches humans about the effects of environmental protection as well as about the warning of the dangers if they do not conserve the environment. Education would also encourage people to actively participate in the in environmental sustainability.

Environmental protection is the third pillar and its main focus is how to protect ecosystems, air quality, integrity and sustainability of our resources and focuses on the elements that place stress on the environment. It is also concernedwith the future of humanity and how technology would a provide a greener future.

A driving force in all these three pillars which would provide a sustainable development is the Mobile Technology, i.e. the next generation of mobile and wireless networks – 5G.

3 5G NETWORK FOR SUSTAINABLE GREEN NETWORKING AND COMPUTING

As it was mentioned in the introduction, one of

the most critical challenges in the design and deployment of the 5G system is the development of green and sustainable networking and computing protocols that are capable of supporting the advocated 1000 times data rates and throughput with a reasonable and affordable energy consumption level [5], [6]. 5G network should provide a support of huge mobile traffic volumes, 1000 times larger than those today in the order of multiples of gigabits per second. In addition, 5G should provide high-speed video flows from 5G server to the 5G subscribers and massive Machine-to-Machine (M2M) communications. In addition, the emerging applications would introduce high mobility, high scalability, real-time, and low latency requirements that raise new challenges on the services being provided to the users.

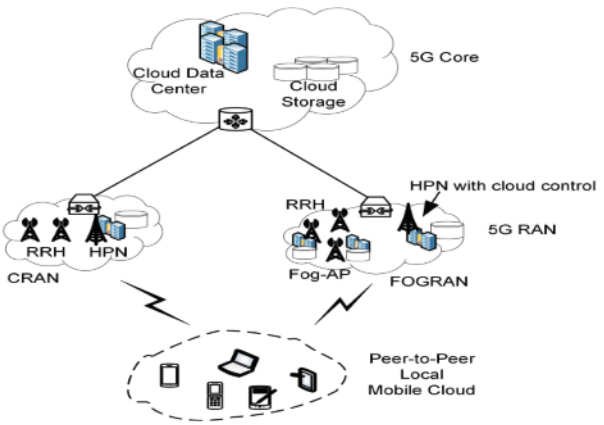


Fig. 1.5G System Architecture for aSustainable Green Networking and Computing.

In order to respond to these challenges, one possibilityis the deployment of a high-performance computing power with the support of centralized mobile cloud computing platform in the 5G core [8]. However, the cloud alone encounters many limits in order to meet the computing and intelligent networking demands in 5G mobile network.

A new paradigm called Fog Computing has emerged to meet these requirements [9]. Fog extends cloud computing and services to the edge of the network. It provides data, computing, storage and application services to end-users that can be hosted at the network edge or even end devices such as set-top-boxes or access points. The main features of Fog are its proximity to end-users, its dense geographical distribution and its support for mobility. It reduces service latency and improves QoS/QoE, that results in superior user experience.

Cloud and fog are inter-dependent because the coordination among devices in a Fog may rely on the Cloud [10]. They are also mutually beneficial. The fog would facilitate the creation of a hierarchical infrastructure, where the analysis of local information is performed locally with the fog computing and networking devices, and the coordination and global analytics are performed at the cloud computing centers.

Therefore, as it is shown in Fig. 2, the cloud in 5G would appear in different forms: centralized cloud in 5G core, distributed cloud in 5G RAN (Cloud RAN and Fog RAN) and distributed peer-to-peer mobile cloud among the 5G smart end user devices [11].

Cloud RAN, or CRAN incorporates cloud computing into radio access networks (RANs). However, the application storing all radio signal processing functions are centralized at the cloud computing server in 5G corewithhigh bandwidth and low latency.

FogRAN, on the other hand, takes the full advantages of local radio signal processing, cooperative radio resource management and distributed storing capabilities in edge devices, which can decrease the heavy burden on front haul and avoid large-scale radio signal processing in the centralized baseband unit pool [12]. The FogRAN consists of fog computing nodes that are located away from the main cloud data centers in 5G core, at the edge of the network. These fog computing nodes have dense geographical distribution. Therefore, they extend the cloud computing at the edge of the network, and provide very low and predictable latency, and high support of mobility.

The capabilities of cloud and fog computing and networking can be spread even to the smart user devices, such as such as smartphones, IoT devices, sensors, etc. The devices form a local so-called distributed peer-to-peer mobile cloud share the resources such as storage space, computational power, bandwidth, etc. with other devices in the same local cloud [13]. The workload of the application is managed in a distributed fashion without any point of centralization. The lack of centralization provides scalability, while exploitation of user resources reduces the service cost. P2P architectures have the ability to adapt to network failures and dynamically change network topology with a transient population of nodes/devices, while ensuring acceptable connectivity and performance. Thus, P2P systems exhibit a high degree of self-organization and fault tolerance.

3 ENERGY EFFICIENCY IN 5G NETWORK

One way to explore the sustainable green networking and computing in 5G is through the Energy Efficiency, which measures how many bits are being transmitted over one Joule consumed energy. The principle for maximizing the energy efficiency is recognized as an ecological goal and is very important for the economics of network operators since it would result with a reduction of operating expenses in the network management [14]. In addition, increased energy efficiency means longer battery life for the smart mobile devices, which would contribute to a greater satisfaction at the mobile device users. Energy Efficiency *EE* is defined as the ratio of average user throughput in a cell, *R*, and the consumed power per user in a cell, *P*:

$$EE = \frac{R}{P}\left[\frac{[\text{bit/s/cell}]}{[\text{Joule/s/cell}]}\right] = \frac{R}{P}\left[\frac{\text{bit}}{\text{Joule}}\right] \quad (1)$$

Throughput is the quantity of data that can pass from source to destination in a specific time. The user throughput is calculated as a ratio of the peak data rate R_{max} of the particular RAN, and the number of smart user devices *N*, proportional to some weight coefficient μ:

$$R = \mu \cdot \frac{R_{max}}{N}\left[\frac{\text{bit}}{\text{s}}\right] \quad (2)$$

Here it is assumed that each RAN (3G, 4G or 5G) provides the maximum peak data rates R_{max} to equally capable smart user devices. The peak data rates for each RAN are given in Table 1 [5].

The weight coefficient μ models the bottleneck problem for the data that carry services from the cloud computing data centers. Due to the increased number of flows for different service requirements, the user throughput given in (3) is decreased for a certain factor.

The weight coefficient μ may receive values between 0.8 and 1, and its value depends on how much the cloud is far away from the radio access network. If the cloud is closer to the base station of the radio access network, then the coefficient μ has higher value, and if the cloud is at a greater distance from the base station of the radio access network, then the coefficient μ would have lower value. If the mobile device uses a service that is located in the fog computing environment, i.e. in the radio access network, then the weight coefficient μ is equal to 1.

The number of the user device is taken to vary from 100 to 1000, with an increment step of 100.

The user power consumption *P* can be expressed through the user throughput *T* with the following linear relation [15]:

$$P = \alpha R + \beta\ [\text{W}] = \alpha R + \beta\left[\frac{\text{Joule}}{\text{s}}\right] \quad (3)$$

where α is the coefficient that gives the power necessary for data transfer (in downlink, or uplink direction), andβ is a coefficient that represents the idle power [122]. Table2 gives the values of these coefficients for 3G, 4G and 5G mobile networks.

Table 1. Peak Data Rate R_{max} in Mbps for 3G, 4G and 5G RAN.

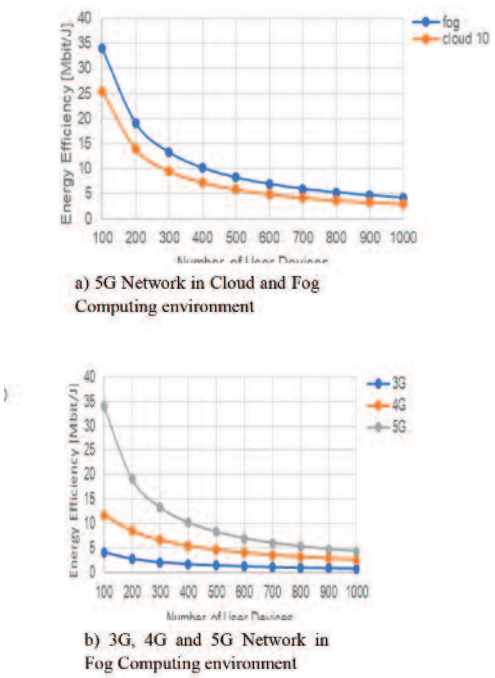
Mobile Network	R_{max} [Mbps]
3G	122.12
4G	51.97
5G	6.5

Table 2. Typical Values for Power Consuming Coefficients.

Mobile Network	α [mW/Mbps]	β [mW]
3G	122.12	817.88
4G	51.97	1288.04
5G	6.5	11475.97

4 RESULTS AND DISCUSSION

In order to evaluate the energy efficiency, the following simulation scenario is used. There is a single region in which a group of smart userdevicesare located, which are simultaneously served by 3G, 4G and 5G RAN network. Each RAN is connected to ten clouds. The first five clouds are in the same region with the RANs, and the other 5 clouds are in a different region with the RANs. The smart user devices are assumed to have equal capabilities and to be simultaneously served by the RANs and the clouds. For simplicity, it is assumed the size of the packets to be constant and each user receives data either from the FOGRANs or fromall cloud computing centers.



a) 5G Network in Cloud and Fog Computing environment

b) 3G, 4G and 5G Network in Fog Computing environment

Figure 3.Energy Efficiency of 3G, 4G, and 5G Networks in Cloud and Fog Computing Environment.

A comparison of the energy efficiency results for 5G mobile network in cloud and fog computing environment is given in Fig. 3a. The comparison of energy efficiency results between 3G, 4G and 5G RAN in fog computing environment isprovided in Fig. 3b. From all the figures,it can be noticed that energy efficiency 5G mobile network provides much higher energy efficiency than 3G and 4G mobile networks. Also, the better energy efficiency is achieved in fog computing environment, rather than in cloud computing environment, independently of the RAN network, especially in 5G. All these results demonstrate the sustainability of 5G network in terms of green networking and computing.

4 CONCLUSION

This paper was about the sustainable green networking and computing in future 5G systems. It was initially discussed the importance of sustainability, together with its main components: economic development, social development and environmental protection. Then, it was pointed out that mobile technology, in particular 5G, would contribute to achieve the sustainability in terms of green networking and computing. The sustainability was evaluated through energy efficiency, an important parameter used to evaluate the achievement of the ecological goals, as wells as to improve the economics of the networks. Better energy efficiency for network operators means reduction of operating expenses in the network management, as well as longer battery life for the smart mobile devices, which would contribute to a greater satisfaction at the mobile device users. Energy efficiency results clearly demonstrated that 5G together with cloud and fog computing environment is a promising solution to provide a technological sustainability in terms of green networking and computing.

5G network, which is expected to be deployed around 2020, would act as a nervous system of the digital society, economy, and everyday people's

life. The cloud in 5G networks will be diffused among the client devices often with mobility too, i.e. the cloud will become fog. More and more virtual network functionality will be executed in a fog computing environment and it will provide mobiquitous service to the users. This will enable new Anything as a Service (AaaS) service paradigms, where devices, terminals, machines, and also smart things and robots will become innovative tools that will produce and use applications, services and data.

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INFORMATION AND COMMUNICATION TECHNOLOGIES (ICT) IMPLEMENTED IN SMART CARS

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ABSTRACT: As technology advances, it has been envisaged that in the very near future, robotic systems will become part of our everyday lives. Even at the current stage of development, semi-autonomous or fully automated robots are already indispensable in a staggering number of applications. To bring forth a generation of truly autonomous and intelligent robotic systems that will meld effortlessly into human society involves research and development on several levels, from robot perception, to control and to abstract reasoning. When it comes to the smart car, Information and Communication Technologies (ICT) are enabling, for instance, advanced control and communication systems in smart cars which can also be used to control the powertrain, brakes and steering, as well as infotainment functions.

This paper presents a concept of the platoon movement of autonomous vehicles (smart cars). Such vehicles have an Adaptive or Advanced Cruise Control (ACC) system also called Intelligent Cruise Control (ICC) or Adaptive Intelligent Cruise Control (AICC). These vehicles are suitable to follow other vehicles for a desired distance and to be organized in platoons. A platoon formation is composed of a vehicle which assumes the platoon leader role (generally the human driven) and other vehicles which play the follower role. For the control of the vehicles with nonlinear dynamics, a combi¬nation of feedforward control and feedback control approach is used. For simulation and analysis of the vehicle and the platoon of vehicles, Matlab/Simulink models are designed.

Keywords: Platoon of vehicles, Smart car, Adaptive cruise control (ACC), intelligent transportation system.

1 INTRODUCTION

A vehicle platoon is a group of vehicles that travels in close proximity to one another, nose-to-tail, at highway speeds. A lead vehicle is followed by a number of other vehicles that closely match their speed and maneuvers to the lead vehicle.

A vehicle platoon might be one of the technological benefits of self-driving (autonomous vehi-

cles), but it doesnotcome without its problems. Grouping vehicles into platoons is a method of increasing the capacity of roads. An automated highway system is a proposed technology for doing this. Platoons decrease the distances between cars using electronic, and possibly mechanical, coupling. This capability would allow many cars to accelerate or brake simultaneously.

Vehicle platoons have been proposed since at least the early 1960s. Before we had wireless communication, GPS and commercially available radar sensors, proposals often included some kind of mechanical coupling between the vehicles, quite like a 'road train' (although, not like a road train you'll see barreling through the outback).

With the exponential power and reliability of autonomous cars, vehicle platooning could be a reality using a mix of technology that's already available such as drive-by-wire steering and throttle control, radar cruise control, lane keep assist systems, GPS, Bluetooth, parking sensors, and cameras that can register and interpret 3D images such as Subaru's Eye Sight system. These features could allow cars to communicate with one another so that a lead car could control a number of following cars.

2 INTELEGENT TRANSPORTATION SYSTEMS

Information Technology (IT) has changed our society into an information society. Computers are generallyaccepted and Internet is available on our laptop, smart phone and mp3-player. For that reason, we have access to huge sources of information, available on the Internet; whenever we like, wherever we like. The value of this ubiquitous source of information manifests itself in providing us with the ability to make better decisions. Better information allows us to automate and optimize our operations.

IT is now about to change our transportation systems as well. While building more roads or fixing old infrastructure is often considered the best option to enhance our transportation system, the future lies increasingly in the use of IT. That is, the information contained in our transportation system is of great value for the optimization of the same transportation system. For example, a traffic light is able to optimize the outgoing traffic flow if it knows the amount of incoming traffic. Hence, IT can make this information available to traffic lights or other elements of the transportation system. In general, it is envisioned that IT is able to increase the efficiency of the current transportation system significantly. However, this will require a significant investment because embedding transportation systems with sensors, wireless communication technologies and other electronics will be required to make them more intelligent. Hence the name Intelligent Transportation Systems (ITS).

The development of ITS applications is driven by its potential benefits of which a few have been described above. ITS enables a wide range of ITS applications, where most of these applications can be organized in the following five categories:

Advanced Traveler Information Systems (ATIS)
Advanced Transportation Management Systems (ATMS)
ITS-Enabled Transportation Pricing Systems
Advanced Public Transportation Systems (APTS)
Vehicle-to-Infrastructure (V2I) and Vehicle-to-Vehicle (V2V) integration

2.1 Vehicle Platooning

One of the ITS concepts is *vehicle platooning*. Vehicle platooning is a concept that aims to increase the current road capacity. The key in achieving this goal is the organization of vehicles in tightly controlled groups, also called platoons that operate close together. As a result, a highway can accommodate more vehicles when vehicles drive in platoons compare to the manual conditions.

Several implementations of the Vehicle Platooning concept have been proposed. A number of potential implementations of vehicle platooning are described below [5]:

*Adaptive Cruise Control (ACC):*In fact, ACC and the conventional cruise control is similar in a situation where a vehicle is not directly following another vehicle. The ACC system maintains under these conditions a pre-set speed. However, when a preceding vehicle is detected, the ACC system adjusts the vehicle's speed in order to maintain a fixed time-gap to the preceding vehicle. This all happens without the intervention of the driver. Vehicles with ACC are equipped with a front radar, shown on Fig. 1. This radar can detect a preceding vehicle and is able to measure the distance and speed of this vehicle. As a result, speed information flows down the platoon with increasing delays; if the first vehicle breaks, the second vehicle detects and reacts to this behavior after a short delay. The third cannot detect the speed change of the first vehicle so it reacts only to the behavior of the second vehicle after another delay. This information enables ACC to react to speed changes and control the vehicle's time-gap to the preceding vehicle. Although this driver task is automated, the driver stays responsible for the speed and steering and can overrule the system when needed. A vehicle platoon arises when a vehicle, equipped with ACC, starts following another vehicle. Fig. 2 illustrates a three-vehicle platoon under ACC. As a result, speed information flows down the platoon with increasing delays: if the first vehicle breaks, the second vehicle detects and reacts to this behavior after a short delay. The third cannot detect the speed change of the first

vehicle so it reacts only to the behavior of the second vehicle after another delay.

Fig. 1. Front radar used in ACC

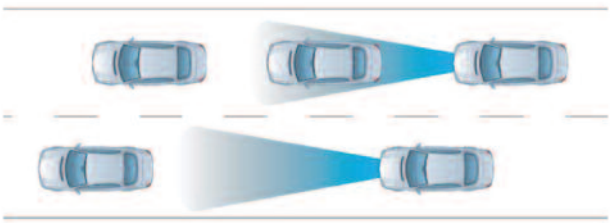

Fig. 2. Vehicle Platoon usingACC.

*Cooperative Adaptive Cruise Control (CACC):*To overcome this shortcoming and to further stabilize the traffic flow, the concept of CACC has been proposed. CACC augments ACC with wireless communication, new control logic and GPS as illustrated in Fig. 3. Wireless communication allows vehicles to extend their view beyond the line of sight of the radar. With CACC, the third vehicle in the illustration is notified via wireless communication of the behavior of the leading vehicle. The third vehicle can almost instantly react to speed changes of the first vehicle and as a result a CACC system enables to drive with closer headways.

Fig. 3. Vehicle Platoon using CACC.

Automated Highway System (AHS): With both ACC and CACC, the driver is (partly) responsible for the operation of the vehicle. The driver is for example still responsible for steering the vehicle. A next step in vehicle platooning is a system in which vehicles are fully automated. Such a system, called AHS, has been under research by the Program for Advanced Technology for the Highway (PATH). AHS aims to produce a highway system where fully automated vehicle are guided to their destination and the flow of traffic is controlled and optimized for maximum efficiency and safety¨. AHS platoons are similar to CACC platoon as illustrated in Fig. 3. However, AHS platoons are highly dependent on wireless communication to create automated and high cooperative vehicles.

3 MATHEMATICAL MODEL OF A VEHICLE

The mathematical model of longitudinal motion of the vehicle is relevant for platoon modeling and control. For modeling,two coordinate systemscan be usedin this case: vehicle-fixed or body-fixed coordinate system, $B(C;x,z)$, and Earth-fixed coordinate system, $E(O;x_0,z_0)$. The velocity of the vehicle has components along x an z axes, i.e. $V_B=[u, v]^T$. Fig. 4 shows free body diagram of a vehicle with mass m. The vehicle is inclined upon angle $\theta$with respect to horizontal plane (slope of the road). The diagram includes the significant forces acting on the vehicle: g is the gravitational constant; D_A is the aerodynamic force; $G=mg$ is the weight of the vehicle; $F_X$is the tractive force; R_X is the rolling-resistance force; and ma_X, an equivalent inertial force, acts at the center of mass, C. The subscripts f and r refer to the front (at B) and rear (at A) tire-reaction forces, respectively.

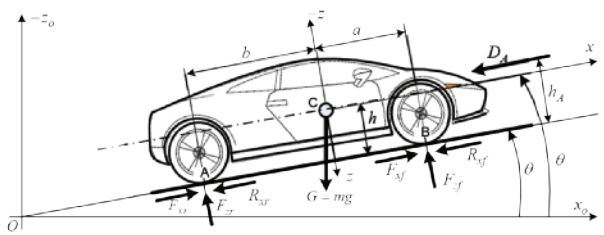

Fig. 4. Forces acting of a vehicle

The application of Newton's second law for the x and z directions gives [8]:

$$m\dot{u} = \quad m\dot{u} = F_{xr} + F_{xf} - G\sin\theta - R_{xr} - R_{xf} - D_A \qquad (1)$$

$$m\dot{v} = 0 = G\cos\theta - F_{zf} - F_{zr} \qquad (2)$$

The aerodynamic-drag force depends on the relative velocity between the vehicle and the surrounding air and it is given by the semi-empirical relationship:

$$D_A = \frac{1}{2}\rho C_d A_f (u+u_w)^2 = \frac{1}{2} C_{air} (u+u_w)^2 \qquad (3)$$

The rolling resistance arises due to the work of the deformation on the tire and the road surface, and it is roughly proportional to the normal force on the tire:

$$R_x = R_{xf} + R_{xr} = f_r(F_{zf} + F_{zr}) = f_r mg\cos\theta \qquad (4)$$

Equation (1), using (3) and (4) can be rewritten:

$$m\dot{u} = F_x - mg\sin\theta - f_r mg\cos\theta - \frac{1}{2} C_{air}(u+u_w)^2 \qquad (5)$$

where is a constant.

Equation (5) is used for the creation of nonlinear Simulink model of the vehicle in the platoon.

For the analysis of the dynamics and stability of the vehicle and string stability of the platoon,a linearized model of the vehicleis needed.

In vector-matrix form, the linearized system gets form [3]:

$$\begin{bmatrix} \Delta\dot{x} \\ \Delta\dot{u} \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ 0 & -\frac{1}{Km} \end{bmatrix} \begin{bmatrix} \Delta x \\ \Delta u \end{bmatrix} + \begin{bmatrix} 0 \\ \frac{1}{m} \end{bmatrix} \Delta F_x + \begin{bmatrix} 0 \\ \frac{1}{m} \end{bmatrix} d \qquad (6)$$

3.1. Control System of vehicle

In cases when the real vehicle is with nonlinear dynamics (equation (5) for longitudinal dynamics), it is very useful to implement the combination of feed-forward control and feedback control approach, presented on Fig. 5.

The feed-forward control is formed on the *inverse model* of the object and on the generator of *nominal trajectories* which generates the desired trajectory $X^o(t)$. This desired trajectory is based on the previously prepared data or from the process of operation of the system based on the measureddata. For the realization of this trajectory it is necessary that regulator in feedback is present, which will generate the needed control $\Delta u(t)$ for the elimination of the error of the trajectory of the object from the desired trajectory. This provides a stabilization of the control process of the object.

$$\mathbf{u}(t) = \mathbf{u}^O(t) + \Delta\mathbf{u}(t) = \mathbf{u}^O(t) - \mathbf{K}(t)\Delta\mathbf{x}(t) = \\ = \mathbf{u}^O(t) - \mathbf{K}(t)[\mathbf{x}(t) - \mathbf{x}^O(t)] \qquad (7)$$

The synthesis of the control law given by equation (7) is performed in two steps. In the first step, the nominal control $u^o(t)$ is determined under the assumption of ideal conditions, i.e. when no dis-

turbances are present.

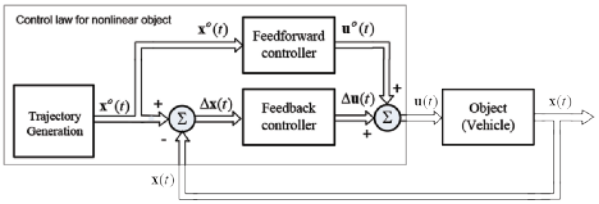

Fig. 5. Concept of feed-forward and feedback control system of nonlinear object.

In this paper PID control design approach is used and PID feedback controller is obtained based on linear model of the vehicle derived from above with parameters determined using numerical values. For the simulation and testing of the vehicle dynamics and vehicle control system, a Simulink model is developed which is shown in Fig.6.A Simulink model can be used for open loopand closed loop simulation of the controlled vehicle.

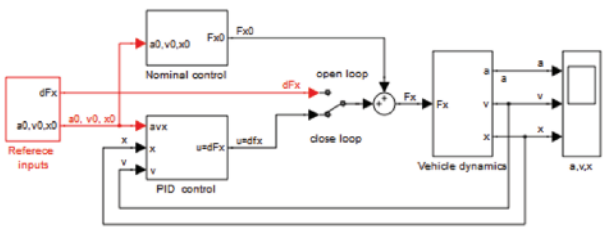

Fig. 6. Simulink diagram for the vehicle control.

4 PLATOON FORMATION AND CONTROL

Platooning requires another level of control beyond individual vehicles. Two fundamentally different approaches to platooning have been suggested: (1) point-following control, in which each vehicle is assigned a particular moving slot on the highway and maintains that position [5]; and (2) vehicle-following control, in which each vehicle in the platoon regulates its position relative to the vehicle in front of it based on information about the lead vehicle motion [6] and locally measured variables (i.e., its own motion and headway to the vehicle in front). In this paper we discuss the vehicle-following control approach, which is the focus of most current research and development work in the area [8].

Based on Fig. 6 and the mathematical model of individual vehicle together with its own control system - Matlab/, a Simulink model of the platoon of 10 vehicles is developed.

In this model, each vehicle gets information about the acceleration, velocity and position of the previous vehicle, and also gets the same information about the vehicle-leader.

By using vehicle model (5), if θ=0 and V_w=0, we can find the acceleration of the vehicle in this form:

$$\dot{u} = a = \frac{1}{m}(F_x - f_r mg - \frac{1}{2}C_{air}u^2), \quad F_x = \Delta F_x + F_{x0} \tag{9}$$

By substituting (8) in (9), we can find the acceleration written for i-th vehicle:

$$a_i = \frac{1}{m}[K_{pi}(x_{i-1} - x_i - hd_i) + \frac{K_{Ii}}{s}(x_{i-1} - x_i - hd_i) + K_{Di}(v_{i-1} - v_i) + F_{x0} - f_r mg - \frac{1}{2}C_{air}u_i^2)], \tag{10}$$

where hd_i is constant distance between i-1-th and i-th vehicles.

For a platoon of vehicles, beside individual vehicle stability,a*string stability* of the platoon is defined [8,9]. If the preceding vehicle is accelerating or decelerating, then the spacing error could be nonzero; we must ensure that the spacing error attenuates as it propagates along the string of vehicles because it propagates upstream toward the last vehicle.

The linear model of the string of three vehicles (vehicle-leader and two vehicles-followers) in vector-matrix form is given with equation (11) and (12):

$$\begin{bmatrix} \dot{x}_1 \\ d\dot{x}_2 \\ \dot{v}_1 \\ \dot{v}_2 \\ \dot{a}_1 \\ \dot{a}_2 \end{bmatrix} = \begin{bmatrix} 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & -1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1 \\ \frac{K_{I1}}{m} & 0 & \frac{K_{P1}}{m} & 0 & \frac{K_{D1} - C_{air}u^0}{m} & 0 \\ 0 & \frac{K_{I2}}{m} & \frac{K_{P2}}{m} & \frac{K_{P2}}{m} & \frac{K_{D2}}{m} & \frac{K_{D2} - C_{air}u^0}{m} \end{bmatrix} \begin{bmatrix} x_1 \\ dx_2 \\ v_1 \\ v_2 \\ a_1 \\ a_2 \end{bmatrix} + \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \\ \frac{K_{I2}}{m} & \frac{K_{P1}}{m} & \frac{K_{D1}}{m} \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} x_L \\ v_L \\ a_L \end{bmatrix} + \begin{bmatrix} 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ \frac{-K_{I2}}{m} & 0 \\ 0 & \frac{K_{I2}}{m} \end{bmatrix} \begin{bmatrix} hd_1 \\ hd_2 \end{bmatrix} \tag{11}$$

If we select for outputs distance between vehicles, dx_2, and velocities v_1 and v_2, we can form output vector, $y=[dx_2\ \ v_1\ \ v_2]$, as:

$$\mathbf{y} = \begin{bmatrix} dx_2 \\ v_1 \\ v_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 \end{bmatrix} \mathbf{x} + \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} x_L \\ v_L \\ a_L \end{bmatrix} \quad (12)$$

The stability analysis of the individual vehicle and platoon of vehicles can be made in Matlab using their linear models and compute poles of the system.

5 SIMULATIONS AND RESULTS

In this paper,a platoon with 10 vehiclesis simulated. Fig.6 presents a basic SIMULINK block diagram for the platoon model. All vehicles have the same parameters. Parameters used in simulations are: mass of the vehicles, air density, frontal area of the vehicle, drag coefficient, rolling resistance coefficient, gravity acceleration, rolling resistance force, velocity of the vehicles, distances among vehicles and parameters of PID controllers. The vehicle-leader generates acceleration, velocity and position which are shown in the pictures below.

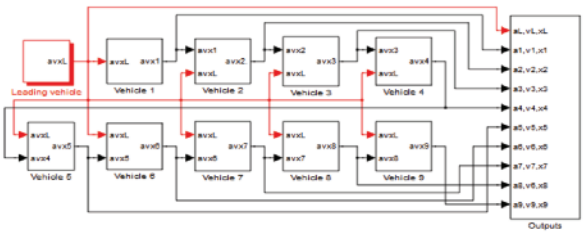

Fig.7. Matlab/Simulink model of the platoon of 10 vehicles.

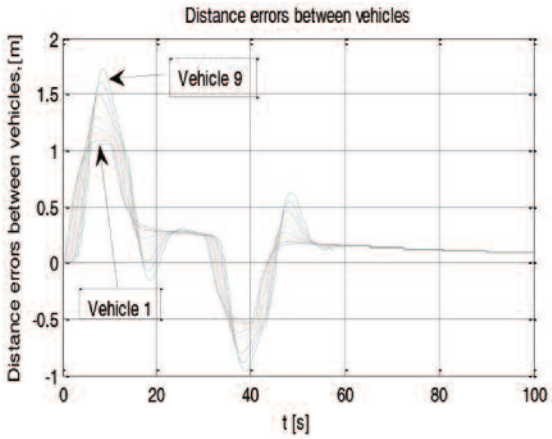

Fig. 8 shows distance errors between vehicles for the same inputs. Fig. 9 shows positions of the vehicles in the platoon when each vehicle gets information for acceleration, velocity and position only for a previous vehicle.

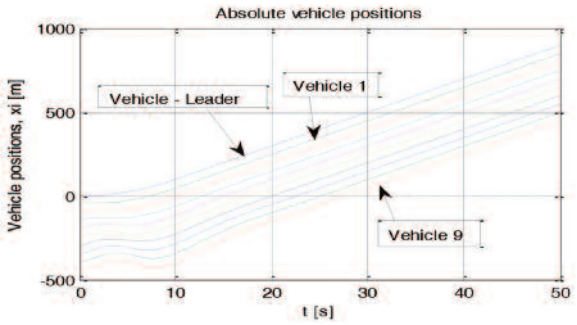

Fig. 8. Distance errors between vehicles; Fig. 9. Positions of the vehicles

6 CONCLUSIONS

In this paper we have developed a nonlinear and linearized model of the longitudinal motion of the vehicle. Feedforward control and feedback PID control approach is applied to design vehicle controller. Using this vehicle model with its designated control system, a model of platoon with ten vehicles is developed. In this model, vehicles can get information for the acceleration, velocity and position for previous vehicles and for the movement of the vehicle–leader. The string stability of the platoon is discussed and the transfer function of the string useful for stability analysis is presented. Based on the developed models,Matlab/Simulink models are createdand theycan be used for simulation and performance analysis of the vehicle dynamics and platoon's control system.

In the future, it is planned more accurate models of the vehicles and platoonsto be developed. We plan to design and test different PID control laws, for example LQR and Fuzzy logic control. The realization of using different sensors and wireless communication among vehicles will be our interest in the future.

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