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Mother Teresa University in Skopje,
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Mirce Acev 4, VII floor, Skopje, North Macedonia

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Excellence in Math education in inclusive classroom through e-Debate and Diversity

Authors: Ana Atanasova[1], Tatjana A. Pachemska[2],Zoran Trifunov[3],Marina Grubelic[4], Camelia Barbatu[5], Dobri Jovevski[6], Gregory Makrides[7], Ana Herrantz Zentarski[8]

1 Faculty of computer science and engineering, University Ss.Ciril and Methodius Skopje, , Republic of North Macedonia,/ University of Aveiro, Portugal,(ana2000stip@gmail.com)

2 Faculty of computer science, Goce Delcev University in Stip, Republic of North Macedonia,(tatjana.pacemska@ugd.edu.mk)
3 University Mother Teresa Skopje, Republic of North Macedonia,(zoran.trifunov@unt.edu.mk)
4 OS Vodice, Croatia
5 PS Ion Agarbiceanu, Alba Iulia, Romania
6 OOU IlindenKrivaPalanka, Republic of North Macedonia
7 Cyprus Mathematical Society, Cyprus
8 Association of Education Open Europe, Reus, Spain

Abstract: Being at school is the most important educational period when students create learning mechanisms, construct knowledge and develop basic skills and acquisition methods. Many academic papers and global reports, such as the "Mathematics Education in Europe: "Common Challenges and National Policies" from the Eurydice network point out the importance of the learner's motivation and engagement. Considering those two points, it is therefore essential to work on a way to improve the level of European pupils on mathematics and make their learning experience less passive.
The main idea in the paper is to find a path to increase the level of mathematics knowledge by raising the motivation for learning. We will achieve this idea by democratising the learning process and involving students in the process of choosing ways they want to learn math. We believe that students should be asked where the problems are, in accessing and understanding the mathematical content - we expect students to be partners in the process of realization of the teaching activities, changing math curriculum and to hear their voice. Because mathematical concepts are related to everyday life activities, it is expected to find interesting mathematical issues/contents/challenges that would be processed in the STEAM context. Modification and modernization of the method of Mathematical Debate as one of the methods that simultaneously achieves five of the basic 8 groups of key competencies defined in the EU documents will be made.

This paper contains elaboration of survey reports based on-line surveys in several countries along with the identified elements from the collection of good practices. Realisation of Survey targeting experienced school teachers in inclusive classrooms, parents and students. We also gathered good practice examples to implement in our inclusive classrooms.

Keywords—*Teacher, Math Education, e-debate, inclusive classroom, diversity*

Introduction

Carl Friedrich Gauss, one of the greatest mathematicians, is said to have claimed: "Mathematics is the queen of the sciences and number theory is the queen of mathematics." We couldn't agree more.But, in

order to understand its greatness, we must be aware of its ubiquity in everyday life, the presence of mathematics that is on an unconscious level a part of all of us human beings, whether scientific or not. And that is something that we aim to accomplish with our students.

Our project named E=MD2: Excellence in Maths education in inclusive classroom through e-Debate and Diversity is a project inspired by the Einstein equation $e=mc^2$, but the variables in the equation have an educational context.The idea is to increase the level of mathematics knowledge by raising the motivation for learning. We will achieve this idea by democratizing the learning process and involving students in the process of choosing ways they want to learn math. We believe that students should be asked where the problems are, in accessing and understanding the mathematical content - we expect students to be partners in the process of realization of the teaching activities, changing math curriculum and to hear their voice. Because mathematical concepts are related to everyday life activities.

Purpose of Study

The main purposes of the study are:

1. Searching excellence in maths education through increasing motivation for learning in an inclusive classroom.
2. Increasing the level of achievements in maths for students with maths disabilities (dyscalculia, dysgraphia, mathematics anxiety...)
3. Strengthening the profile of the maths teachers, by sharing knowledge, exchanging experience and developing new educational products to contribute to the issue of searching excellence in maths education in an inclusive classroom.

This paper contains elaboration of survey reports based on-line surveys in several countries along with the identified elements from the collection of good practices. Realisation of Survey targeting experienced school teachers in inclusive classrooms, parents and students. This activity refers to the implementation of a survey targeting school teachers/leaders, parents and students.

Research Methods

- Questionnaire was administered via Google Forms and answered in an online form.
- Target groups were teachers, students and parents in schools in Spain, North Macedonia, Romania and Croatia.
- Only difficulties we were having during the data collection process were deadlines for participants to fill the questionnaire.

In our survey 177 teachers participated. They were from 4 European countries – Spain (25), North Macedonia (23), Romania (27) and Croatia (102). Majority of 177 teachers who participated in survey have 15 or more years of experience in teaching (28% in Spain, 56.5% in North Macedonia, 88.9% in Romania and 46.1% in Croatia – overall 51.42%)

In the survey there were 274 students participants 11-15 age, 81 from Croatia, 43 from North Macedonia, 78 from Spain and 72 from Romania and 169 parents.

Findings and Results

From this survey we can see that teachers are aware of problems regarding teaching Maths, now more than ever. Issues, as shown, are very similar no matter what country. Although teachers connect teaching contents with everyday life, it seems as if the students do not see the purpose and importance of Maths.
Most teachers feel that they have freedom in deciding about teaching methods and evaluation criteria, but are not as much satisfied with the current curriculum.

Another problem that is visible are gifted students and students with learning disabilities because teachers do not feel competent enough and do not feel that they have enough time to dedicate to those students.
Even though most of the students find Maths difficult and challenging, they are aware that Maths is very important in everyday life. They, as it is expected, learn better through discussions, solving real life problems, connecting subject matter to life itself, projects, through their involvement in the teaching process.
Also, we mustn't neglect teachers' role in Math classes. They have shown that it's crucial that teachers are fair in evaluation, in obtaining working atmosphere and discipline, in moderating discussions and finding a good and interesting way of teaching and getting the subject matter as near as possible to students and problems they can connect with.
Most of the parents recognize lack of motivation and connection between Math classes and everyday life the biggest problems with learning and gaining interest in Math subjects. It is a general opinion that Maths is difficult and that students are not motivated enough.

Conclusions and Recommendations

Comparing our survey groups we came to this conclusion:

- **Interest/Lack thereof -** Recognising the importance of maths with regards to its application to real life.
  Lack of interest is recognized as the biggest problem in learning Maths mostly because students do not see the connection between real life and Maths, especially content they learn in school.
- **Professors' performance-** Teachers are mostly satisfied with curriculum and their autonomy to teach and evaluate with their own criteria. However, there is enough space to improve subject content and above all methods that we use to teach.
- **Motivation-Lack thereof –** The second biggest problem is lack of motivation, again due to lack of connection with real life. Lack of motivation is recognized in all three survey groups as something that needs to be worked on.
- **Anxiety -** distress or uneasiness caused by fear of underperforming or failing at maths is rarely associated as the cause for students to underperform. But, there is a very strong connection among professors' performance, methods and attitude towards students and their motivation and interest in the subject.

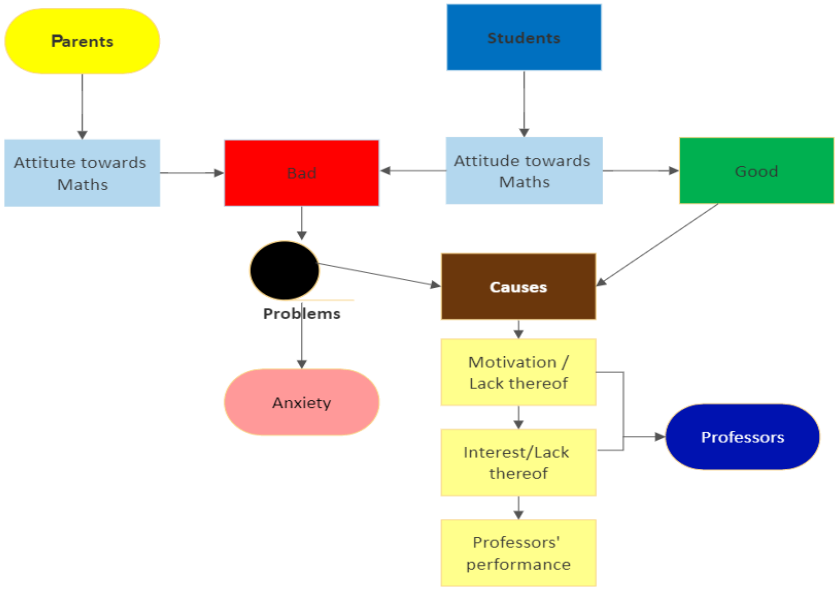

Image 1. Schematic of the predictions for data results

-Analyse/Compare the opinions in relation to "problems with maths" and its possible causes:

- **Interest/Lack thereof**
  - PARENTS 70 % of them claim that their children have problems with Maths due to lack of interest and not understanding the subject's connection to life.
  - STUDENTS also agree with parents. The main problem is lack of interest in the subject because they have a hard time finding Maths useful in everyday life.
  - PROFESSORS know that Maths is often found difficult to understand and therefore is lack of interest.
- **Professors' performance**
  - PARENTS find professors' performance and methods important for understanding the subject
  - STUDENTS are likely to love Math and not have problems with it if they have confidence in their teachers' performance, evaluation criteria, willingness to help them and answer all their questions.
  - PROFESSORS are mainly satisfied with curriculum and autonomy to teach and evaluate with their own criteria. They understand the importance of their performance and their various methods of teaching as well for the gifted and for students with some disabilities.
- **Motivation/Lack thereof:**
  - Both, PARENTS and STUDENTS find it very important to have the right motivation due to be successful in any part of education and life. Therefore, they recognize the lack of motivation as a big problem and think that students could be motivated with other creative teaching methods and involve them more in practical ways of learning, combining subject to everyday life situations and connecting matter to relatable issues.

- **Anxiety:**
  - Although some students find Maths difficult and challenging and Maths do engage some anxiety problems, this is not as common as we initially expected.
  -

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Impact of Leadership Styles (Transactional vs. Transformational) on Employee Motivation in the SME in North Macedonia

Doc.Dr. Bujamin Bela &Prof.Dr. IzetZeqiri

Mother Teresa University

Abstract

Leadership is one of the key determinants associated with the success and failure of any organization. Leadership style is the manner in which people are directed and motivated by a leader to achieve organizational goals. Effective leadership behaviors can facilitate the improvement of performance when organizations face new challenges. Leadership is a communication process betweenleaders and individuals. So, the effectiveness of an organization depends upon the effective leader and an effective leader is a person who has an effective leadership style. Leadership is a very important factor for any organization or group. In other words, we examine the relationship between leadership styles and employee motivation in North Macedonia SME enterprises. The present study attempts to investigate the most preferred leadership behaviors among thetransactional and transformational leadership styles and their impact on Employees' motivation. The focus was only on two major leadership styles - transformational and transactional. This study has provided deep insights into leadership styles, and we expected that transformational leadership will have a positive impact on employeemotivation, however, transactional leadership should have a negative impact on employeemotivation, as it does not provide opportunities and freedom to employees. In this study, both primary and secondary research has been conducted. The primary research has been done using the quantitative approach, with the help of a survey instrument, based on a questionnaire. The secondary research has been done through the review of previously established literature for achieving the research objectives. We are expected that transactional leadership styles will have a negative relationship with employeemotivation. On the other hand, we expected that transformational leadership styles will have a positive relationship with employeemotivation. It has been recommended that organizations use a leadership style that enhances the capabilities and abilities of the people.

Keywords: Employees Motivation, Transformational, Transactional, Leadership Style.

The role of IT in the pandemic-education

Abstract

What if the corona pandemic happened only 30 years earlier? In the early nineties of the last century in these areas, Internet communication was almost unknown, and creating infrastructure conditions for its fast development required extremely expensive investments.

The high level of IT development at the time of the outbreak of the corona pandemic contributed to greatly mitigate its consequences, not only in industry, but also in areas such as education, healthcare, software companies and others.

If there was no high level of IT development, during the corona-pandemic there would be almost no conditions for the work of schools and colleges, as well as the work of companies, where workers can carry out their work duties using IT technology and an electronic device, connected on the Internet.

In this article, we will give a special review to the benefits of IT in the corona pandemic for the educational process, and we will also consider the disadvantages, which we have seen during that period.

VesnaDimitrievskaRistovska
Faculty of Computer Science and Engineering,
"Ss. Cyril and Methodius" University, Skopje, Macedonia
vesna.dimitrievska.ristovska@finki.ukim.

Strengthening the Society Awareness for the Municipal Waste Management in North Macedonia

Authors:Musah Fejzulov[1], Monika Lutovska[2] and Zoran Trifunov[3]
[1]Mother Teresa University, North Macedonia, (musah.fejzulov@unt.edu,mk)
[2]Mother Teresa University, North Macedonia, (monika.lutovska@unt.edu,mk)
[3]Mother Teresa University, North Macedonia, (zoran.trifunov@unt.edu.mk)

Abstract: Environmental protection, as one of the biggest challenges of modern living, represents a basic human value and right, which we have an obligation to protect and promote at the same time, raising the level of public awareness to improve the quality of life. Sustainability and the way of planning and managing urban environments is a main indicator of the level of environmental awareness, the level of pollution, the quality of infrastructure and waste management policies. This paper aims to contribute to raising the level of awareness of proper disposal and selection of waste, especially among the young population, for a better understanding of the benefits of selection and recycling, as well as for the improvement of waste management concepts. In our country, it is a disappointing fact that young people between the ages of 18 and 30 select waste significantly less than other age groups. Awareness, habits and behavior in the selection of waste showed that 4 out of 10 citizens from the largest cities in the country always or often select waste, namely 82% plastic and 34% paper. About 79% of citizens who have never sorted waste, believe that the main reasons for this are the lack of containers/bins for sorting, but also the absence of education and acquiring habits for waste sorting. The activities for the realization of the research include students, and a survey regarding the problems of waste management, was conducted among them.

Keywords—*waste, sustainability,selection of waste, recycling, environmental protection*

Introduction

By 2050 global amounts of municipal solid waste are estimated to reach 3 billion tons per year. In 2021 896 066 tons of municipal waste was generated in North Macedonia. Unfortunately, about 99.8 % ended in landfills. Moreover, 83% of the municipal waste was of the mixed municipal waste type (not collected selectively). Decision makers and waste managers in developing and especially in emerging countries have to respond to this increasing environmental problems. Likely, intense educational and informational campaigns have to be performed to the society which is coupled with rapidly growing energy demands. The volume of the municipal solid waste has an increasing trend in recent years. The waste treatment strategy have to be revised and look for other applicable waste treatment strategy. Effort are under way to identify projects and solutions. However, there are several challenges which are specific to the waste management culture. Some of them are, high CAPEX and OPEX, limited opportunities for technology localization, low awareness in the society about the potential and importance of the recycling etc. This paper will focus on ways young population can be forged to achieve sustainable solutions, such us explaining the potential of collecting the waste selectively.

Purpose of Study

The mainpurpose of this study is raise the awareness of proper disposal and selection of waste, especially among the young population.

Research Methods

The target group for this research were university students. Surveys regarding the problem with the municipal waste, were conducted. Workshops and presentations were organized with this target group, were the common waste management challenges were discussed.

Findings and Results

The realized surveys in the selection of waste showed that 4 out of 10 citizens from the largest cities in the country always or often select waste, namely 82% plastic and 34% paper. About 79% of citizens who have never sorted waste, believe that the main reasons for this are the lack of containers/bins for sorting, but also the absence of education and acquiring habits for waste sorting. Also, a case study for the landfill Rusino was done. It was concluded that if the plastic is recycled, which accounts for 16% of the waste, an income of around 2 150 000 euros could be generated.

Conclusions and Recommendations

The collection of data, the summarization of the results and the processing of the feedback was done through the conducted survey, but also the results of a case study were presenting. Of course, a higher level of awareness of the waste treatment was achieved, better information was provided to those present, the level of education was raised and a continuous opportunity for information was provided through a web page where the users can be informed about how to collect the waste selectively.

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Analyses Of TheDigitalization Process and Formal Definition of Computation

BekimFetaji[1], Majlinda Fetaji[2], MirlindaEbibi[3], ShpetimLatifi[4]
1 Mother Teresa University, North Macedonia, (bekim.fetaji@unt.edu.mk)
2South East European, North Macedonia, (m.fetaji@seeu.edu.mk)
3Mother Teresa University, North Macedonia, (mirlinda.ebibi @unt.edu.mk)
4 Ministry of Education and Science, North Macedonia, (shpetim.latifi@mon.gov.mk)

Abstract: The purpose of this research is to investigate the current state of digitalization process andfind out the impact to the formal definition of Computation. We can describe a computation. But can we tell what it is computing?Over time, the definition of computing has been a moving target. Computation meant the mechanical steps followed to evaluate mathematical functions. Today, computation is seen as a natural process as well as an artificial one. This is a serious challenge to the tradition of definitions tying computation to computers.The most familiar computations are the numerical computations that we all do in everyday life. Once we get rid of the idea that computation is about numbers, we can easily identify other operations that qualify as computations the non-numerical computations.Experimentalists and theoreticians make heavy use of computation for understanding their data. Computers are physical devices that are designed by engineers to perform computation. In nature sciences, a well-known example is the process of cell division, common to all biological organisms, which involves copying and processing information stored in the form of DNA.The classical Turing machine model has long served as the fundamental reference model because an appropriate Turing machine can simulate every other computational model known. So, in this project is shown the Formal Model of Computation where are defined the Alphabet, Strings, and Languages which are the basics for formal definition of computation.The research methodology used is triangulation technique which combines qualitative and quantitative methodology.The issues, findings as well as recommendations are discussed and argumented.

Keywords*—digitalization, formal definition of computing, non-numerical computations, Turing machine model, processing information, computation*

1. Introduction

Nowadays, we live in a time where almost everything is driven by software, and the entire industries are reshaped from the ICT and requirements of knowing ICT is becoming a necessity. Information and communication technology changes the meaning of social relationships and the nature of how work is done.

According to (Denning, 2010) the question “what is computation?” is at least as old as computer science. It is one of those questions that will never be fully settled because new discoveries and maturing understandings constantly lead to new insights and questions about existing models. It is like the fundamental questions in other fields—for example, “what is life?” in biology and “what are the fundamental forces?” in physics—that will never be fully resolved.

The adoption of robotics has been becoming prominent in computational thinking literature (S Amri, C W Budiyanto and R AYuana, 2019). The modularity characteristics of Lego robotics, for example, enable learners to construct their understanding of the abstraction of complex robotics parts. Educational organizations that adopt computing would be likely to introduce computational thinking as an

integrated part of the regular curriculum. Over the past 10 years, robotics competitions popularized what is called an informal and productive studying atmosphere with the potential to increase student interest in mathematics and science motivating students to track careers in the field of science, technology, engineering, and mathematics and through programming training, children can learn to develop their skills and ideas on computational motivating and improving the fluency of students in computational thinking.

Most people understand a computation as a process evoked when a computational agent acts on its inputs under the control of an algorithm. The classical Turing machine model has long served as the fundamental reference model because an appropriate Turing machine can simulate every other computational model known (Robert W. Cojfin, Harry E. Goheen, and Walter R. Stahl, 1963). The Turing model is a good abstraction for most digital computers because the number of steps to execute a Turing machine algorithm is predictive of the running time of the computation on a digital computer (Soare R. I., 2009). However, the Turing model is not as well matched for the natural, interactive, and continuous information processes frequently encountered today (Van Leeuwen, 2001). Other models whose structures more closely match the information processes involved give better predictions of running time and space. Models based on transforming representations may be useful (Peter Wegner, Dina Goldin, 2003).

Today, computation is seen as a natural process as well as an artificial one. This is a serious challenge to the tradition of definitions tying computation to computers (S Amri, C W Budiyanto and R AYuana, 2019).

1.2 Research Objectives

The research objective of the study is to investigate into several important research questions by providing answers and arguments:

Researching the impact of digitalization processtoday in general, and asses its impact. Researching the adaptation aspect of the digitalization process by students and teachers. Research on how computation term has changed with the digitalization and development of ICT.

2. Literature Review

Over time, the definition of computer science has been a moving target. These stages reflect increasingly sophisticated understandings of ***computation***.

In the 1930s, Kurt Gödel, Alonzo Church, Emil Post, and Alan Turing independently gave us the first definitions of computation. Gödel defined it in terms of the evaluations of recursive functions. Church defined it in terms of the evaluations of “lambda expressions”, a general notation for functions. Post defined it as series of strings successively rewritten according to a given rule set. Turing defined it the sequence of states of an abstract machine with a control unit and a tape (the Turing machine). Influenced by Gödel’s incompleteness theorems, Church, Turing, and Post discovered functions that could not be evaluated by algorithms in their systems

(undecidable problems). Church and Turing both speculated that any effective procedure could be represented within their systems (the Church- Turing thesis). These definitions underlay the earliest formal notions of computing(Scott, 1967).

In the time that these men wrote, the terms "**computation**" and "**computers**" were already in common use, but with different connotations from today. Computation meant the mechanical steps followed to evaluate mathematical functions. Computers were people who did computations. In recognition of the social changes they were ushering in, the designers of the first digital computer projects all named their systems with acronyms ending in "-AC", meaning automatic computer—resulting in names such as ENIAC, NIVAC, and EDSAC(Soare R. I., 2016).

In the late 1980s, the computational science movement, claimed computation (and computational thinking) as a new way of doing science(RajeevAlur, David L.Dill, 1994). Supercomputers were their main tools. But now computation was more than the activity of machines; it was a practice of discovery and a way of thinking. Finally, in the 1990s, scientists from natural science fields started to claim that information processes exist in their deep structures.

2.1. Numerical computation

The most familiar computations are the numerical calculations that we all do in everyday life: adding up prices, multiplying the length and width of a room to compute its surface, dividing a quantity into equal parts, etc. Most people today have even more occasions for doing numerical calculations in their professional lives. Basic arithmetic on anything that can be quantified is so fundamental that it takes up a significant part of training in the first years of school. Mechanical aids for numerical operations, such as the abacus, have been used for at least 2000 years and perhaps even for much longer (Cooper, 2017).

We do not think much about how we do simple arithmetic operations on small numbers, and in fact we often just recall the result that we have internalized due to frequent use. But as soon as we work on larger numbers, mental calculation becomes a mechanical activity based on rules we have learned (Gaßner, Computation over algebraic structures and a classification of undecidable problems, 2017).

When operations become too complex to be handled in the head, we turn to pen and paper for a more reliable record of the intermediate results in our calculations. The rules for arithmetic can then be formulated as rules for manipulating sequences of symbols, which can be applied mechanically.

2.2. Non-numerical computation

Once we get rid of the idea that computation is about numbers, we can easily identify other operations that qualify as computations. One example is solving equations by algebraic manipulations. The practical evidence is that computers can do the job. Software packages that implement such operations are called computer algebra systems, emphasizing algebraic manipulations (Gaßner, Computation over algebraic structures and a classification of undecidable problems, 2017).

A perhaps more surprising use of computation in mathematics is the validation of proofs. A proof is a sequence of deduction steps, each of which establishes the truth of a statement based on other statements already known to be true and a finite set of rules of logic deduction. This involves writing the proof in some formal language, as a sequence of symbols. The 'proof checking' computation transforms this sequence of symbols into a 'true' or 'false' statement about the proof's validity.

Leaving the narrow scope of mathematics, we find a huge number of domains where computation is applied to textual data. Finding a word in a text is a computation: it transforms the input data (the text and the word to look for) into output data (the position in the text where the word occurs), both of which can be encoded as sequences of symbols(Olivier Bournez, Amaury Pouly, 2018).

Another kind of data that are becoming increasingly important for scientific computation are graphs, in particular when used to describe networks. An example of a computation on graphs is

a check for cycles. This transforms the input data (a graph) into output data (a list of all cycles in the graph).

2.3. The roles of computation in scientific research

The most visible role of computation in scientific research is its use as a tool. Experimentalists process their raw data, for example to correct for artifacts of their equipment. Theoreticians compute numerical predictions from a model, in order to compare them to experimental results. Both experimentalists and theoreticians make heavy use of computation for understanding their data, in particular using visualization techniques (Denning, 2010).

Computers are physical devices that are designed by engineers to perform computation. Many other engineered devices perform computation as well, though usually with much more limited capacity. The classic example from computer science textbooks is a vending machine, which translates operator input (pushing buttons, inserting coins) into actions (deliver goods), a task that requires computation. Of course a vending machine does more than compute, and as users we are most interested in that additional behavior. Nevertheless, information processing, and thus computation, is an important aspect of the machine's operation.

For structures over the real numbers, we know machine-oriented models such as the real RAM's introduced on the basis of the concept presented in (Gaßner, An introduction to a model of abstract computation: the BSS-RAM model, 2019).

The same is true of many systems that occur in nature. A well-known example is the process of cell division, common to all biological organisms, which involves copying and processing information stored in the form of DNA. Of course, living organisms are not just computers. Information processing in organisms is inextricably combined with other processes. In fact, the identification of computation as an isolated phenomenon, and its realization by engineered devices that perform a precise computation any number of times, with as little dependence on their environment as is technically possible, is a hallmark of human engineering that has no counterpart in nature. Nevertheless, focusing on the computational aspects of life, and writing computer programs to simulate information processing in living organisms, has significantly contributed to a better understanding of their function.

2.4. Basics of Formal Language Theory

The basic definitions and theorems in the area of *computational complexity*, which tries to study various models of computation with the goal of understanding their relative computational power, and classify computational problems in terms of computational resources they need(Cooper, 2017).

Recall that the computational problems one studies in the context of theoretical computer science are usually *decision problems*(Gallier, 2010). Decision problems are those where given an input, one expects a boolean answer. Typically, input instances are encoded as strings over some alphabet of symbols.

No matter how we view a language, we are typically considering two things:

- The **syntax**, i.e., what are the "legal" strings in that language (what are the "grammar rules"?).
- The **semantics** of strings in the language, i.e., what is the meaning (or interpretation) of a string.

The semantics is usually a lot more interesting than the syntax but unfortunately much more difficult to deal with!In the recognition point view, we typically assume some kind of "black box" M (an automaton) that takes a string w as input and returns two possible answers: those for which the expected answer is "yes"/"true" and those for which the answer is "no"/"false". Therefore, a decision problem is often identified with a language, or a collection of strings, namely, those for which the problem demands a "yes" answer (Viswanathan, 2018).

Similarly, the machines we will define, will answer "yes"/"accept" or "no"/"reject" on input strings, and we associate a language $L(M)$ with machine M, which is the collection of all strings it accepts. Given this interpretation of problems and machines, we will typically say that a machine M solves a problem L (or rather accepts/recognizes) if $L = L(M)$, i.e., M answers "yes" on exactly the inputs that the problem demands the answer to be "yes".

2.5. Alphabet, Strings, and Languages

According to (John E. Hopcroft, Rajeev Motwani and Jeffrey D. Ullman, 2006) an *alphabet* Σ is a finite set of elements. A (finite) *string* over Σ is a (finite) sequence $w = w_0 w_1 \cdots w_n$ over Σ (i.e., $w + i \in \Sigma$, for all i). The length of a string $w = w_0 w_1 \cdots w_n$, denoted $|w|$, is the number of elements in it, which in this case is $n + 1$. The unique string of length 0, called the *empty string*, will be denoted by ε. For a string $w = w_0 w_1 \cdots w_n$, the ith symbol of the string w_i will be denoted as $w[i]$. For strings $u = a_0 a_1 \cdots a_n$ and $v = b_0 b_1 \cdots b_m$, their *concatenation* is the string $uv = a_0 a_1 \cdots a_n b_0 b_1 \cdots b_m$. The set of all (finite) strings over Σ is denoted by Σ^* ; we will sometimes use Σ^i to denote the set of strings of length i. A *language* A is a set of strings, i.e., $A \subseteq \Sigma^*$. Given languages A, B, their concatenation $AB = \{uv \mid u \in A, v \in B\}$. For a language A, $A^0 = \{\varepsilon\}$, and A^i denotes the i-fold concatenation of A with itself, i.e., $A^i = \{u_0 u_1 \cdots u_n \mid \forall j. u_j \in A\}$. Finally, the *Kleene closure* of a language A, is $A^* = \bigcup_{i \geqq 0} A^i$(Robič, 2015).

2.6. Formal Model of Computation

Let $M = (Q, \Sigma, \delta, q_0, F)$ be a finite automation and $w = w_0 w_1 \cdots w_n$ be a string over Σ. We say that M **accepts** w if there is a sequence of states $r_0 r_1 \cdots r_n$ in Q such that the following hold (Mikhail J. Atallah, Marina Blanton, 2010):

1. $r_0 = q_0$
2. $\delta(r_i, w_{i+1}) = r_{i+1}$ for $0 \leq i < n$
3. $r_n \in F$

- Condition (1) says that the machine starts its computation in the start state
- Condition (2) says that as long as input is available the machine goes from state to state according to its transition function δ.
- Condition (3) says that the machine accepts its input if it ends up in an accept state. (Stefan D. Bruda, Selim G. Akl, 2003)

We say that a machine M recognizes the language A if $A = \{w | M \text{ accepts } w\}$(Sipser, 2013).

4. CONCLUSION

The research study provides a review of the published literature as well as an analyses of the emerging trends of different definitions of computing.

In this research study we gave sophisticated understandings of *computation.* How computation is seen as a natural process as well as an artificial one. There were mention the most familiar computations: the

numerical computations and the *non-numerical computations*.We mention how e*xperimentalists* and *theoreticians* make heavy use of computation for understanding their data. How computers are physical devices that are designed by *engineers* to perform computation. we gave a well-known example how is used computation in *nature science.*Finally, was shown the *Formal Model of Computation* where were defined the *Alphabet*, *Strings*, and *Languages* which are the basics for Formal Definition of Computation. Are algorithms really at the heart of computer science, or is the more fundamental and overarching concept of representation the mind? Science discovers information processing processes for which algorithms are unknown. Are there no algorithms at all for some of these information processes? This model solves the vexing question: "What is information?" No. It deals with the objective part of the information (representation and its attribution to the referring person) but does not rely on the subjective aspects of the information (individual observers). You can proceed without solving the observer problem. This definition of computation also supports a clear definition of computational thinking. Computational thinking is a problem-solving approach that poses problems as information processes involving computer models (which may need to be invented or discovered) and seeks algorithmic solutions. Pioneers in the field used the term "algorithmic reasoning" to describe how computer scientists' thought processes differ from other sciences The term "computational thinking" came into common use to describe the way computer scientists approached problem solving, calling it a new paradigm in science and this is the most often use of the term.

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Analyses and Comparison Of The Turing Reduction And Mapping Reduction

MajlindaFetaji[1], Bekim Fetaji[2], MirlindaEbibi[3], FestimHalili[4]
1 South East European, North Macedonia, (m.fetaji@seeu.edu.mk)
2Mother Teresa University, North Macedonia, (bekim.fetaji@unt.edu.mk)
3Mother Teresa University, North Macedonia, (mirlinda.ebibi @unt.edu.mk)
4 University of Tetovo, North Macedonia, (festim.halili@unite.edu.mk)

Abstract: The research study focuses on investigation of the concept of reduction, focusing on two forms of reduction: mapping reducibility and turing reducibility and we compare them. The main objective is to provide formal definitions examples, analyse and compare different types of reducibility. A systematic review of the examples is based on background research of published research. The comparison of the two revealed that he turing reduction is more general than mapping reduction. Insights and discussion of the results are discussed and provided.

Keywords—*Reduction, Mapping reducibility, Turing reducibility, concept of reduction*

1. Introduction

In mathematics, as in everyday life, a typical way to solve a new problem is to reduce it that has already been solved. Frequently, an instance of the new problem is expressed completely interms of an instance of the prior problem, and the solution is then interpreted in the terms of the new problem. This form of reduction is called many-one reducibility, and is described below. Analyses and Comparison of mapping reducibility and turing reducibility is the focus of the study. A reduction is an algorithm for turning one problem into another in computability theory and computational complexity theory. A sufficiently efficient reduction from one problem to another may be used to show that the second problem is at least as difficult as the first. Problem A can be reduced to problem B if the problem B algorithm (if it existed) could also be used effectively as a subroutine to solve problem A. If this is valid, it can notbe more difficult to solve A than to solve B. In order to indicate the type of reduction being used (m: mapping reduction, p: polynomial reduction), we write A $\leq$m B, usually with a subscription on the$\leq$.

In some articals and books, the therm MAPPING is used in different word. That word is MANY-ONE.Inarticals and books you will see the word many-one instead of the word mapping.

Example of a reduction from the boolean satisfiability problem (A ∨ B) ∧ (¬A ∨ ¬B ∨ ¬C) ∧ (¬A ∨ B ∨ C) to a vertex cover problem. The blue vertices form a minimum vertex cover, and the blue vertices in the gray oval correspond to a satisfying truth assignment for the original formula.

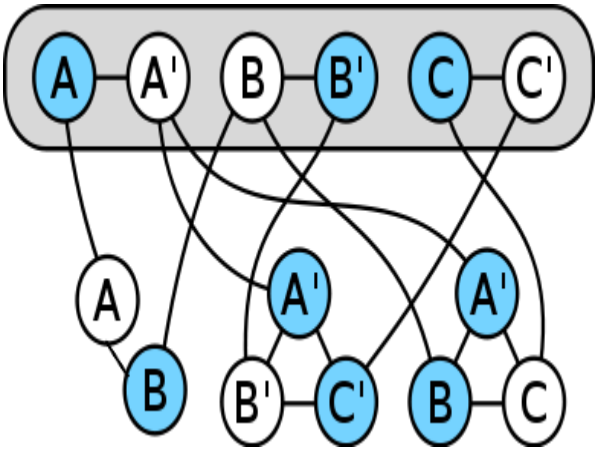


Figure 1. A reduction from the boolean satisfiability problem

As mentioned in the above example, computational complexity uses two main types of reductions, the multi-one reduction and the Turing reduction. Mapping reducibility instances from one problem to instances from another, Turing reductions calculate the solution to one problem, assuming it is easy to solve the other problem. As Conclusion it show that Mapping reducibility is a stronger type then Turing reducibility, and is more effective in separating problems into distinct classes of complexity. The increased restrictions on mapping reducibility, however, make it harder to find them. A problem for a complexity class is complete if every problem in the class reduces to that problem, and it is in the class itself as well. In this sense, the problem represents the class, as any solution to it can be used to solve every problem in the class in combination with thereductions.

1.2 Research Objectives

The research objective of the study is to investigate into several important focusing on two forms of reduction: mapping reducibility and turing reducibility and we compare them. The main objective is to provide formal definitions examples, analyse and compare different types of reducibility. by providing answers and arguments:

2. Mapping reducibility

A Mapping Reducibility is a reduction in computability theory and computational complexity theory that converts instances of one decision problem into instances of a second decision problem. Therefore Mapping Reducibility can be used to calculate the relative difficulty of two problems in computing. The definition of mapping reducibility is Suppose A and B, respectively are formal languages over the alphabet. A mapping reducibility from A to B is a total computable function $f : \Sigma^* \rightarrow \Sigma^*$ that has the property that each word w is in A if and only if f(w) is in B.

If such a function f exists, we say that A is many-one reducible or m-reducible to B and write A

≤mB, if there is a computable function
f : Σ*→Σ*, where for every w, w ∈ A ⇔ f (w) ∈ B.

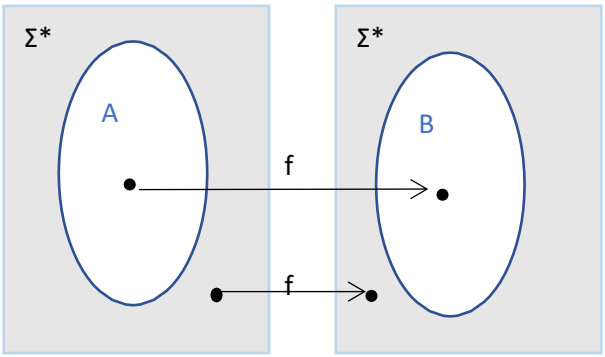


Figure 2. Redaction function

The function f is called the reduction from A to B. A is said to be reduced to B if B is more difficult to solve in terms of the layman than A. In other words, any B-solving algorithm can also be used as part of a (otherwise relatively simple) A- solving system. Mapping reducibility are a particular case and a stronger type of reductions in Turing. The oracle (i.e. our solution for B) can only be invoked once at the end with mapping reducibility, and the answer can notbe changed. It means that if we want to prove that problem A can be reduced to problem B, we can only use our solution for B once in our solution for A, unlike in the reduction of Turing, where we can use our solution for B as many times as we need to solve A. This means mapping reducibility instances from one problem to instances from another, while Turing reductions calculate the solution to one problem, provided that the other problem is easy to solve. Mapping reducibility is more efficient in separating problemsintodistinct classes of complexity. The increased constraints on mapping reducibility, however, make it harder to locate them. A problem for a complexity class is complete if every problem in the class reduces to that problem, and it is in the class itself as well. In this sense, the problem represents the class, as any solution to it can be used to solve every problem in the class in combination with the reductions.

Theorem 1:

If A ≤ m B and B is decidable, then A is decidable. Theorem2 :

If A ≤ m B and B is recursively enumerable, then A is recursively enumerable. Corollary 1:

If A ≤ m B and A is undecidable, then B is undecidable.

Corollary 2:

If A ≤ m B and A is not in RE, then B is not in RE. Corollary 3:

If A ≤ m B and A is not in coRE, then B is not in coRE.

2.1 Mapping Reductions inGeneral

Mapping reductions apply not only to computing, but to wide areas of mathematics. Consider the following two sets, for example:

1. The set of equations of the form Ax 2 + By + C where the coefficients are integers,that have a root consisting of positiveintegers.
2. The set of knots that can be untied (without tearing or breaking the rope) leaving at most ℓloops

Even though these two sets have very different nature, they are reducible to each other (by mapping reductions). In this course we concentrate mainly on computing related problems, but reductions are relevant in much wider scopes

2.2 TMEquality

Theorem: BothEQ and itscomplement,EQ , are not enumerable. Stateddifferently,
TM TM
EQ is neither enumerable norco-enumerable.
TM

- We show that*A* is reducibletoEQ . The same function is also amapping
TM TM
reduction from*A* toEQ , and thusEQ is not enumerable
TM TM TM

- We then show that*A* is reducibletoEQ . The new function is also amapping
TM TM
reduction from *A* toEQ , and thusEQ is not enumerable
TM TM

TM TM TM

Claim: A is reducible to EQ.

TM TM

$f_1 : A_{TM} \longrightarrow EQ_{TM}$ works as follows:

F_1: On input (M, w)

- Construct machine M_1: on any input, reject.
- Construct machine M_2: on input x, run M on w. If it accepts, accept.
- Output(M_1, M_2).

F_1: On input (M, w)

- Construct machine $M1$: on any input, reject.
- Construct machine $M2$: on any input x, run M on w. If it accepts, accept x.
- Output $(M1, M2)$.

Note:

- M_1 accepts nothing
- if M accepts w then M_2 accepts everything, and otherwise nothing.
- so $(M, w) \in A_{TM} \Longleftrightarrow (M_1, M_2) \in EQ_{TM}$
- f_1 is clearly computable. Thus it is a reduction from A_{TM} to EQ_{TM}.

Claim: A is reducible to EQ.

TM TM

$f_2 : A_{TM} \longrightarrow EQ_{TM}$ works asfollows:

F : On input (*M,w*)

- Construct machine M_1: on any input,*accept*.
- Construct machine M_2: on any input *x*, run *M* on*w*.

  If it accepts, *accept*.

- Output (M_1,M_2).

F_2: On input (*M, w*)

- Construct machine M_1: on any input,accept.
- Construct machine M_2: on any input *x*, run *M* on *w*. If it accepts,accept.
- Output (M_1,M_2).

  Note

- M_1acceptseverything
- if *M* accepts *w*, then M_2 accepts everything, and otherwisenothing.
- $(M, w) \in A_{TM} \Leftrightarrow (M_1, M_2) \in EQ_{TM}$.
- f_2 is clearly computable. Thus it is a reduction from A_{TM} to EQ_{TM} .

2.3 Example for Mappingreducibility

Example 1

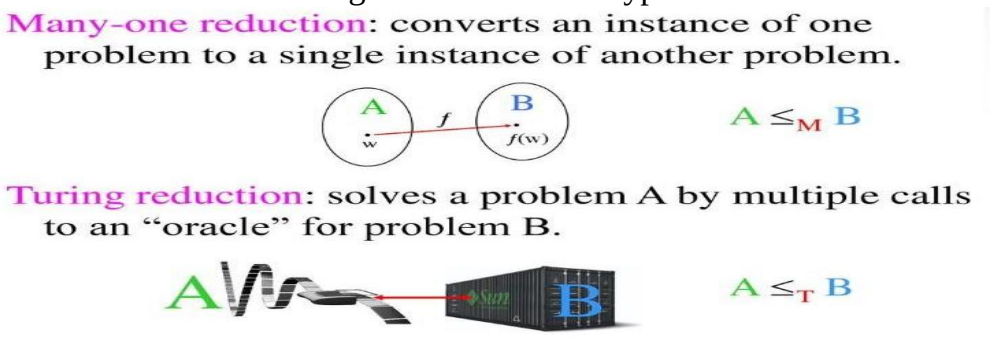
There is a mapping reduction f from ATM to HALTTM. The
following TM F computes f:
On input hM, wi;
construct a new TM M′ by
on inputx
run M on x
if M
accepts
accept
if M rejects
enter an infinite
loop f(hM, wi) =
hM′
, wi
/* M accepts w iff M′ halts on w */
Conclusion: HALTTM is undecidable since ATM is undecidable.

Example 2
There is a mapping reduction f : ETM → EQTM. On input hMi;
construct a new TM M′ which rejects all inputs;
The mapping reduction f is defined by f(M)
= hM, M′
i.
/* Notice the property: L(M) = ∅ iff L(M) = L(M′)*/ Conclusion:
EQTM is undecidable since ETM is undecidable.

4. Turing reducibility

In computability theory, a reduction of Turing (also known as a reduction of Cook) from problem A to problem B is a reduction that solves A, assuming that the solution to B is already known. It can be interpreted as an algorithm that could be used to solve A if a subroutine to solve B had been open to it. It can be understood as an algorithm that could be used to solve A if it had available to it a subroutine for solving B. More formally, a Turing reducibility is a function computable by an oracle machine with an oracle for B. turing reducibility can be applied to both decision problems and function problems. More formally, a turing reducibility is a function that an oracle machine with an oracle for B can compute. Turing reducibility can be extended to both problems of decision and functionproblems.

Figure 2 . Reduction types



Oracle Turing Machine: An “oracle Turing machine” is a modified Turing machine that has the additional capability to query an oracle. Denote MB as an oracle Turing machine that has an oracle for language B.

Language A is Turing reducible to language B, written in $A \leq TB$, if there exists an oracle Turing machine MB that decides A.

Theorem: if $A \leq mB$, then $A \leq TB$.

We can let MB = On input $x \in A$,

Compute $y=f(x) \in B$.

Query the oracle for B. If $y \in B$, accept; else, reject.

This theorem shows that Turing Reduction is more general than Mapping Reduction.

Besides Turing reduction, several other types of reduction have been defined to observe the relative computability between sets under various conditions and requirements, including:

• Many-one reduction: $A \leq m B$, if there is a computable function f

such that for each x, $x \in A$ if and only if $f(x) \in B$. In fact, a set A is

r.e. if and only if $A \leq mK$.

• One-one reduction: $A \leq 1 B$, if the function f in many-one reduction

is a one-to-onefunction.

• Truth-table reduction: $A \leq tt B$, if there is a computable function f

such that for each x, $x \in A$ if and only if $B\sigma f(x)$

. Here $\{\sigma i\}i \in \omega$ is a total list

of truth tables.

• Weak-truth-table reduction: $A \leq wttB$, if A is Turing reducible to B, with a computable function f which bounds the use of the reduction. The use function is defined as: for the reduction $A = \Phi B$, $\varphi(x)$ is the largest number n in B that is referred to while computing$\Phi B(x)$.

5. CONCLUSION

The research study provides a review of the published literature as well as an analyses of the the concept of reduction, focusing on two forms of reduction: mapping reducibility and turing reducibility and we compare them. The main objective is to provide formal definitions examples, analyse and compare different types of reducibility.

In this research study we gave sophisticated understandings of *computation*. Turing reductions are more general than many-one reduction. A many-one reduction is also a Turing reduction, but some Turing reductions are not many-one reductions. This is provably the case for (arbitrary) computable reductions. For example, there is a Turing reduction from the halting problem to its complement, but no such many-

one reduction.Completeness is defined with respect to many-one reductions since it allows making finer distinctions. Turing reductions, for example, don't allow us to distinguish the halting problem from its complement, or NP from coNP, but many-one reductions do.

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Trajectory-following Algorithm for Arduino Mobile Robot

Zoran Gacovski[1],Blerim Sulejmani[1], Ridvan Ali[1]

[1]Mother Tereza University, 1000 Skopje, N. Macedonia, zoran.gacovski@unt.edu.mk

Abstract. In this paper - we present our research and experimentation with the Arduino mobile robot. We have developed a control algorithm for its movement along a given trajectory.The Arduino robot is the official robot of the Arduino company. The robot consists of two integrated boards. The lower board is called the motor board and its task is to control the operation of the motors that drive the robot. The upper board is used for reading sensors' data and for robot control. Both boards are microcontroller-based using the ATmega328P microcontroller.

The hardware of the Arduino robot and the entire process of software development -are explained in the paper. Basic methods of operation ofArduino platform, its restrictions and main functionalities are also explained. In our work – we have applied the available Arduino software tools and functions. We have developedcustom software code for robot movement control, by utilizing the existing software for the motor board of the Arduino robot. We have investigated different control algorithmsfor line (trajectory) following – P (proportional), PI proportional-integral) and PID (proportional-integral-differential).

The PID algorithm hasproved to be the most efficient algorithm that allows the robot to smoothly follow the line at high speeds without any short-term departures from it. The paper shows how to implement the algorithm, and at the same time how to quickly and finely adjust the parameters of the PID algorithm. We emphasized the importance of having a stable platform for algorithm implementation(line tracking), and for proper response of microcontroller's board components.

The afore-mentioned implementation of the line tracking algorithm provides a framework for further development on the Arduino robot platform and its potential use. There are many parts of the platform that are not covered by this work, such as the compass, sound, screen and the like, which can be used for future projects. The platform also has the ability to connect with other sensors, which can further be used for the development of various projects and products.

Keywords: Arduino mobile robot, Microcontrollers, PID algorithm, Trajectory following.

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Prevalence of *Listeria monocytogenes* in a variety of meat products and the meat processing environment

Erënesa Gorçaj[2],Arbenita Hasani[1], Senad Muqaku[2], Ermiona Ahmetaj[1], Karsten Giffey[3], Driton Sylejmani[1], Bledar Bisha[4], Afrim Hamidi[1]

[1]University of Prishtina “Hasan Prishtina”,[2]Food and Veterinary Agency of Kosovo,

[3]European College of Veterinary Public Health subsp. FS

[4]Department of animal science, University of Wyoming-USA,

Abstract

Background

Listeria monocytogenes remains as one of the most important zoonotic foodborne pathogens, causing serious health issues, especially in children, elderly, immunocompromised people, and pregnant women, with high mortality. Data about human listeriosis in Kosovo are lacking.As the meat processing industry is constantly growing and aiming to expand market presence, monitoring of*Listeria*monocytogenes in processed meat products using established microbiological criteria and regulatory guidelines, becomes paramount.

Objective

The objective of this study was to evaluate the prevalence of *Listeria monocytogenes* in selected meat products, including sausage, minimally processed, cured meat, precooked and cooked and fast-food meat products as well as environmental samples.

Materials and Methods

In total, 107 samples, including 22 minimally processed meat samples, 12 sausage samples, 10 cured meat samples, 8 precooked and cooked meat, samples, 25 burger samples priror and after heat treatment and 30 envrionment samples were taken from meat processing facilities. Samples were tested using the ISO 11290 method and confirmation followed 18 R Listeria (Lioflichem).

Results

Nine out of 107 samples were confirmed to be contaminated with *Listeria monocytogenes.*Specifically, 4 in fresh meat and minimally processed meat samples, 2 processing environment samples, and 3 samples obtained from fast food facilities were confirmed as positive.

Discussion and Conclusion

This study shows that fresh meat and fresh meat products marketed in the country are routinelycontaminated with *L. monocytogenes*,serving as likely vehicles for human listeriosis, especially when coupled with improper heating. Positive environmental samples indicatedeficiencies in cleaning and sanitation.The study provides ample evidenceof the presence of *L. monocytogenes* in meat processing facilitieswith potential for transfer to meat products.

Perspectives

Meat processors are committed to implementing and validating Good Manufacturing Practices, including proper cleaning and sanitation programs. Development and adequate monitoring of critical control pointsduring slaughter, processing, and fast-food chain, have to be appliedand documented.

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Defining indicators of sustainable development in the food industry

Mirjeta Ilazi, Prof.dr. Atanas Kochov
Faculty of Mechanical Engineering – Skopje, Rep. of North Macedonia
E-mail:mirjetailazi.mi@gmail.com; atanas.kochov@mf.edu.mk

Abstract: the paper explains the way of the research that was done using the AHP methodology to reveal the indicators that contribute to sustainable development in the production of the food industry. The concept of sustainable development is based on the general goal that strives to achieve economic and technological development without damaging the environment. The research was developed in the Republic of North Macedonia, being more concentrated in the region of Tetova and Pollog, where all relevant institutions with an impact on the development of the industry were interviewed.
The Government of the Republic of North Macedonia, through the National Council for Sustainable Development, reaffirms its commitment to the realization of Agenda 2030 of the Organization of United Nations (UN).

Keywords: sustainable development, AHP methodology, criteria, alternatives, EC-expert choice**.**

Introduction Defining the hierarchy of the problem, determining the indicators as well as clarifying them with appropriate comparisons of their values for the Republic of North Macedonia and the EU in the direction of the sustainable development of Macedonia is of special importance. The idea of the research starts from the main goal, "Identification of the indicators for sustainable development"

Purpose of studythe paper aims to investigate the influence of individual indicators on the efficiency of production from the aspect of sustainable development in the agro-sector and the food industry in the Polog region.

Research methods The Analytic Hierarchy Process (AHP) is a method for organizing and analyzing complex decisions, using mathematics and psychology. It was developed by Thomas L. Clocks in the 1970s and has been refined ever since. It contains three parts: the ultimate goal or problem we are trying to solve, all the possible solutions, called alternatives, and the criteria by which you will judge the alternatives. AHP provides a rational framework for the required decision by quantifying its criteria and alternative options and relating those elements to the overall objective. Stakeholders compare the importance of the criteria by comparing the criteria in pairs.

Findings and results The processed results with the EC (expert choice) software give us quantified values that are easy to compare and to create a priority scheme of activities to achieve the goal.

Conclusions and recommendation After analyzing the processed results, we conclude that we have consistent results and According to the indicators that emerged from the answers given by the experts when filling out the questionnaires using the EC tool we can conclude that alternative no. 5 "Investment in Education" is ranked highest in each of the three groups of factors.

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Public procurement in the schools of the Republic of North Macedonia

Bukurie Imeri-Jusufi[1] BlertaKondri[2]ArbenJusufi[3]

[1]Univeristy „Mother Teresa"-Skopje

Faculty of technical sciences, Republic of North Macedoniae-mail: [1]*bukurie.imeri@unt.edu.mk*,[2] Univeristy „Mother Teresa"-Skopje

Faculty of technical sciences, Republic of North Macedoniae-mail: [2]blerta.kondri@unt.edu.mk,

[3]Alples.kos-Prishtina, Kosovoe-mail:[3]benjusufi@gmail.com

Abstract

The financing of education is considered one of the most important factors in the education system, and within that, the financing of primary and secondary schools is the basis of their functioning. Primary and secondary education is provided with funding from the Budget of the North Macedonia, according to

established legal rules and norms. These obtained funds are used by the schools to cover their expenses in order to be able to function in an efficient manner and to be able to achieve their goals. The majority of purchases of goods, services and things necessary for the functioning are subject to the Low on Public Procurement. Modern, innovative, fair and open public procurement systems are an important segment of the economy of every country, which contribute to transparency and accountability in the spending of public funds. This paper will investigate the methods and procedures used in public procurement, for the procurement of goods, services and works for primary and secondary schools in the Republic of North Macedonia. The data will be collected through a survey questionnaire that will cover over 100 respondents from the entire country.

Key words: primary and secondary schools, public procurement, Bureau of Public Procurement, methods and procedures

Assoc. Professor Fati Iseni[1]

Fati.iseni@unt.edu.mk

PhD Candidate Agim Jakupi[2]

Agim.jakupi@unt.edu.mk

Abstract

Title: Intercultural dialogue as a preventive premise

Human history does not move chaotically and aimlessly, but it has purpose and can define things regardless of what stand we have, positive or negative. In this matter, religion gives us opportunities for a more realistic approach with a contemporary method of dealing with problems related to culture and civilizations. Precisely, the issue of culture and civilization is presented to us as a very sensitive and relevant topic not only in local but also global frameworks. Modern man is faced with challenges, a challenge that continues even today. Specifically, September 11, 2001 is the beginning of the public release of the bomb threatening the peace and security of the world. Interreligious and intercivilizational dialogue, the tendency and tendencies to overcome clashing and conflicting paradigms represents the only way to establish peace. People should communicate with each other and respect each other regardless of their religion. Religion is one of the most powerful, deeply felt and influential

[1]Professor of Political sciences, Mother Teresa University Skopje, Republic of North Macedonia
[2] Ass. Prof. of Political sciences, Mother Teresa University Skopje, Republic of North Macedonia

forces in human society. It gives breathe into interpersonal relationships, having an impact in various areas, whether in the family, socially, politically and economically.

Key words: history, religion, culture, dialogue, security, civilization, peace.

VIOLENCE AGAINST CHILDREN AS A "*PRODUCT OF VIOLENT DOMESTIC CRIME*" POTENTIAL RISK FOR DISAPPEARANCE OF GENERAL SOCIAL WELFARE

Phd. candidate Rahim **JASHARI**[3]
Prof. Dr. Shaban **SULEJMANI**[4]
Doc. Dr. Hasan **ASANI**[5]

Abstrakt

Child abuse within the family, as a result of violent domestic crime, is not a new social problem. However, it is unfortunate that it is considered an "accepted" part of our culture not only among Albanians but also in other communities in our country and beyond in some countries in the region. It may not be acknowledged that child abuse within the family is a widespread phenomenon, but even violence against children in our society today has not yet received the same level of attention as other types of crimes, namely violent domestic crime.

Not surprisingly, this issue is essentially considered a private matter. This, together with the fact that the family has traditionally been considered a source of love and support, has led to an element of denial at both the community and individual levels.

The family, as the most important institution within our society, is extremely complex. It is both a "social control agency" and a "social support agency", and its internal dynamics can have both positive and negative effects on relationships.

Violent crime manifested within the family itself, results from the possible presentation of delinquent and criminal behavior by juveniles. The appearance of juvenile delinquency and other types of violent crime, its roots and sources, perhaps and are outside the focus of state-institutional intervention and regulation, seem to be in the family itself.

[3] University of Mather Teresa - Skopje
[4] Lecturer at Faculty of Islamic Sciences - Skopje
[5] Faculty of Islamic Scientecy-Skopje

Crime within the family circle and in the family within, and then "as its product" displayed in society, causes, among other things, numerous negative effects of far-reaching proportions, children and juveniles as perpetrators of delinquent and criminal acts.

Keywords: ***child abuse, family, crime, delinquency and social.***

The role of ICT tools in teaching mathematics

Elena Karamazova Gelova[1],MirjanaKocaleva Vitanova[2]

[1]Faculty of Computer science, "GoceDelcev" University, Stip, R. N. Macedonia, elena.gelova@ugd.edu.mk

[2]Faculty of Computer science, "GoceDelcev" University, Stip, R. N. Macedonia, mirjana.kocaleva@ugd.edu.mk

Abstract: Nowadays the rapid development of technology has made easy availability of a large number of ICT tools. In that way, their application in education became possible. So, various ICT tools began to be applied in the teaching process in many subjects and mathematics was no exception. In this paper we will state which ICT tools can be used in teaching mathematics. Then we will state the results of a research on the advantages of using ICT tools in teaching mathematics, conducted among students from the ninth grade in primary school "GoceDelchev" in Sveti Nikole. And finally, the conclusion that we will draw about the advantages and disadvantages of using ICT tools will be given. In the conclusion we mainly point out that the application of ICT tools in teaching mathematics contributes to facilitating learning, increasing the desire to solve mathematical tasks, raise the teaching process to a higher level and also motivate students to work and learn more independently.

Keywords*—ICT tools, technology, teaching process, mathematics*

Extended Abstract

Towards Sustainable6GArtificially Intelligent Mobile Communications

Authors: Stojan Kitanov[1], Vladimir Nikolikj[2], and Toni Janevski[3]

1 Faculty of Informatics, Mother Teresa University, Skopje, Macedonia,

(stojan.kitanov@unt.edu.mk)

2 Faculty of Informatics, European University, Skopje, Macedonia, (v.nikolikj@gmail.com)
3 Faculty of Electrical Engineering and Information Technologies, Ss Cyril and Methodius University, Skopje, Macedonia, (tonij@feit.ukim.edu.mk)

Abstract: Societal, economic, and environmental aspects of sustainability have become increasingly important design criteria in developing future technologies, along with the United Nations Sustainable Development Goals (UN SDGs) framework that sets specific goals and targets to be achieved by 2030. The rapid advancements of mobile networks may play a major role in accomplishing some of these sustainable development goals. 5G mobile network which already offers various broadband applications and services, is already commercially available. However, 5G wireless communication network already begins to face with the challenge of limited data speed exacerbated by the proliferation of billions of data-intensive applications. To address this problem, researchers are developing cutting-edge technologies for the envisioned 6G wireless communication standards, aiming the first deployments in 2030, in order to satisfy the escalating wireless services demands. The development of 6G network should contribute in achieving the 2030 agenda for sustainable development goals, adopted by all UN members. The aim of this research paper is to identify and formulate a process to recognize the connection between UN sustainable development goals and 6G network. It would also propose a sustainable 6G network architecture which would be evaluated in terms of energy efficiency.

Keywords*—5G, 6G, Artificial Intelligence (AI), Internet of Things (IoT), mobile networks, mobile technology*

Introduction

Societal, economic, and environmental aspects of sustainability have become increasingly important design criteria in developing future technologies, along with the United Nations Sustainable Development Goals (UN SDGs) framework that sets specific goals and targets to be achieved by 2030[1]. The rapid advancements of mobile networks may play a major role in accomplishing some of these sustainable development goals.

The 5th Generation of mobile and wireless networks marked the beginning of a veritable digital society, by achieving significant improvements in terms of latency, data rates, spectral efficiency, mobility and number of connected smart mobile devices [2]. However, 5G wireless communication network already begins to face with the challenge of limited data speed exacerbated by the proliferation of billions of data-intensive applications [3].

To address this challenging issue, researchers have already focused in developing cutting-edge technologies for the envisioned 6G wireless communication standards, aiming the first deployments in 2030, in order to satisfy the escalating wireless services demands[4]. Machine Learning and generally Artificial Intelligence (AI) are becoming necessity for further expansion of the beyond 5G mobile world. AI-assisted IoT services, data collection, analytics and storage should be native in 6G networks. Terahertz, visible light communication and technologies like compressed sensing theory, new channel coding, large-scale antenna, flexible spectrum usage, AI-based wireless communication and special features as Space-Air-Ground-Sea integrated communication and wireless tactile network are few of the novelties that are expected to become a common network standard of 6G.

The development of 6G network should contribute in achieving the 2030 agenda for sustainable development goals, adopted by all UN members. The aim of this research is to identify and formulate a process to recognize the connection between UN SDGs and 6G. The aim of this research is to identify and formulate a process to recognize the connection between UN SDGs and 6G. It would also propose a sustainable 6G network architecture which would be evaluated in terms of energy efficiency.

Purpose of Study

The aim of this research paper is to identify and formulate a process to recognize the connection between UN sustainable development goals and 6G network. It would also propose a sustainable 6G network architecture which would be evaluated in terms of energy efficiency.

Research Methods

The research methodology would be based on providing the vision of 6G network, the enabling technologies, and the associated challenges. Then it would be based on identifying the connection between the sustainable goals of the 2030 UN agenda and 6G networks. On this basis it would be proposed a sustainable 6G network architecture which would be evaluated in terms of energy efficiency and power consumption.

Findings and Results

6G is expected to become a ubiquitous wireless network possible**,** which would providea quality, sustainable, and resilient infrastructure which would support the growing demands of the population. The infrastructure should provide support in different public and private sectors. The deployment of 6G would stimulate the Industrial growth and the rise of digital economy**.** This would result with opening of new job positions and new career pathways.

A 6G network architecture which would accomplish these goals is given on Figure 1. The main driving force in designing and optimizing 6G architectures, protocols, and operations is expected to be AI deployed in both 6G core and at the edge of 6G network. This would transform the wireless evolution from "connected things" to "connected intelligence everywhere."

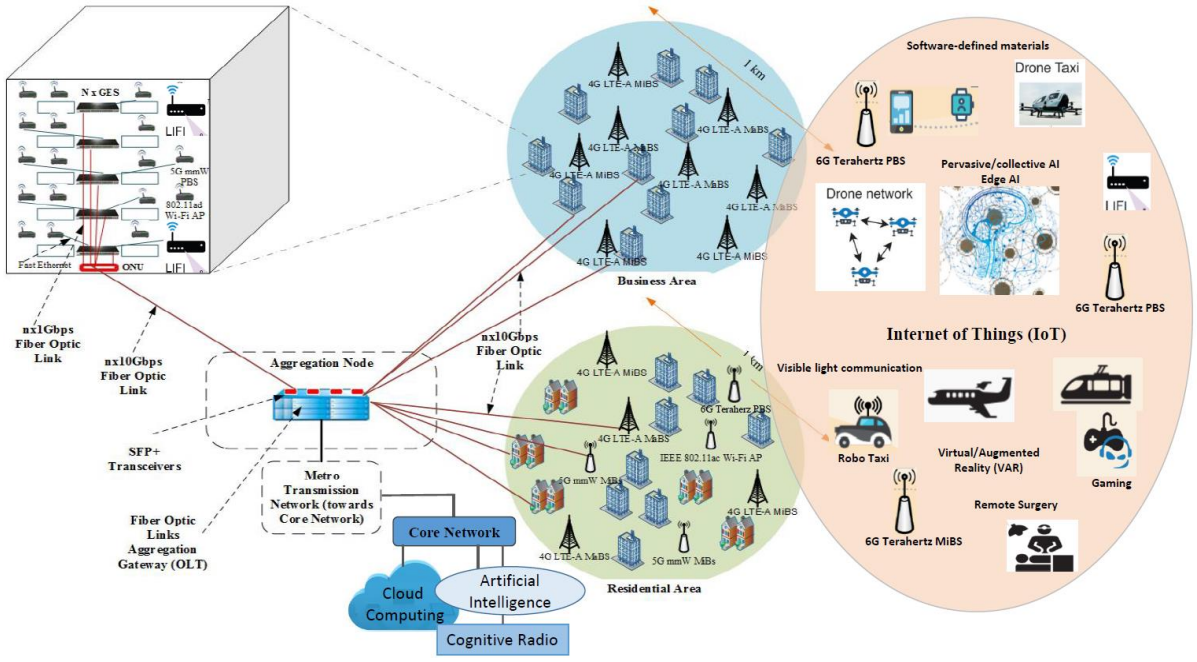

Figure 1. A Sustainable Artificially Intelligent 6G Network Architecture

Below are given the results of Energy Efficiency at the core and the edge part of 6G network. It can be noticed that 6G offers much higher energy efficiency by using the Edge AI, rather than the AI in the core part. This means that much higher quantity of data can pass through 6G network by using the Edge AI, for lower power consumption.

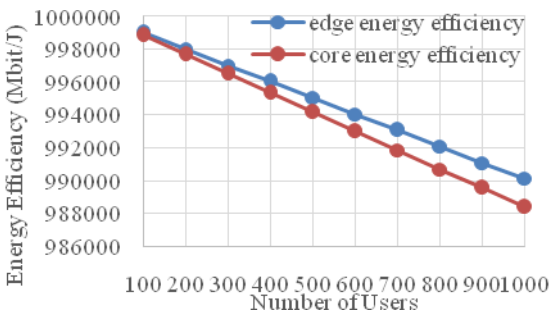

Figure 2. A Comparison of downlink energy efficiency in 6G Network in both core and edge AI environment

Conclusions and Recommendations

Artificial intelligence deployed on the core and edge part of the network would be the driving force in designing and optimizing 6G architectures, protocols, and operations. The results demonstrated that 6G network offers much higher user throughput in both downlink and uplink direction by using the Edge AI, rather than the AI in the 6G core. AI can significantly optimize the 6G network performance based on its powerful learning ability and strong reasoning ability. Artificial Intelligence is the important characteristic of 6G networks, where with the application of AI, 6G networks can learn to achieve self-configuration, self-optimization, self-organization and self-healing, finally increasing the feasibility level. In addition, AI-enabled 6G security provides intelligent, robust security solutions.

6G network would provide a significant increase of QoS and QoE level, as well as it would contribute for a future sustainable development, by providing a support in some of the goals of 2030 UN agenda for bringing peace in the world and prosperity to all mankind.In particular the main contributions are expected to be in the providing support for the critical infrastructure, such as healthcare and government resources, support for the online education, and support for the industrial growth and rise of the digital economy. This survey may serve as an enlightening guideline for future research works in sustainable green 6G communications.

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Smart TTI coupled with NIR technology for development of safety food cold chain

Authors: Vladimir Kitanovski[1], Sani Demiri[1], Olga Popovska[1],

1 University Mother Teresa Skopje, Faculty of Technological Sciences 1, North Macedonia,(vladimir.kitanovski@unt.edu.mk)

Abstract: Cold treatment processes are very important in the field of food preservation, reliability of the product and extending shelf life. Nowadays large percentage of people knows how important is healthy diet on general health, thus the demand of quality food products is very high. Information that packaging of food product gives to the customers carry essential information about food quality and safety. Smart packaging integrated sensors or indicators provide information about the integrity and the time–temperature history of the food package. This is important for sustainable development of supply and demand, because on one side the demand of fresh food products comes from the consumers, and on the other side information about shelf life will lead to financial benefit for the companies, informing customers about freshness level of food product and also it will have impact on decreasing of food waste. Smart TTI can be coupled with NIR sensors and through this technology we can have fully automated supply cold chain system in the food industry, which will lead us to development of sustainable and safety food supply systems.

Keywords*—NIR technology; Smart TTI; food safety; supply cold chain*

Introduction

There is a growing need for food information on packaging as consumers increasingly want to know what ingredients or components are in the product and how the product should be stored and used [1]. Inappropriate storage and manipulation of food products leads to decreasing initial quality parameters and shelf life, so this means increased food waste [2]. Wasting food is not only an ethical and economic issue but it also depletes the environment of limited natural resources (i.e. water, energy, chemical substances and materials).All actors in the food chain have a role to play in preventing and reducing food waste, from producers and processors of food to retailers and consumers, the relevance of household waste suggest that advances in packaging can be an essential tool to reduce food waste [3].

Purpose of Study

The main aim of this scientific workwas to develop “Time-Temperature indicator” – TTI, which will give information about freshness level, quality and safety of the food product itself. The working mechanism TTI will be based on changing of colors on the label so it will provide easily readable, visual information to the customer

Research Methods

The scientific and fundamental novelty of our time temperature indicator can be discussed from several aspects. First the mechanism of the sensor will be based only on natural ingredients and small sample of the product itself, it will precisely react with the freshness state of the sample (product) [4]. This will lead to increased trust in interactive communication with the consumers, due to the absence of optimization, modification and pairing indicator parameters with shelf life of the food product (which is the mechanism of existing TTI) [5].

Findings and Results

During laboratory analyses, the developed TTI showed precise spectral changes compared to the qualitative analyses [6] conducted at the bioengineering laboratory at the Faculty of Technological Sciences at Mother Teresa University in Skopje. Analytical analyses were conducted during cold storage of fresh meat and fish samples. During storage as quality properties decrease, spectral changes of developed TTI occur [7]. Obtained results convinced us that developed TTI is working precisely and correctly show the condition of the food product in real time.

Conclusions and Recommendations

Today in North Macedonia there are zero companies which produces fresh meat and fish products and using this kind of technology on their packaging, so it's our believe that product developed with this project will attract interest among stakeholders [8]. Smart time-temperature label is new technology that brings certain disagreements, fears, repulsions in the industry sector, also the consumers will be with certain reserves (will that smart sensor work properly in any conditions, in any environments etc.) and the policy makers will have their reserves too (will it be applicable, whether it will be accepted in our country etc.).With application of TTI smart label, companies in food industry will eliminate the possibility of deterioration in initial qualitative properties of their product which are caused by improper handling in the food supply chain or in the retailer stores [9]. We strongly believe that our TTI smart label will equally meet the needs of all parties involved in the process and ensure sustainable development.

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Abstract

Curriculum Development forEducation Towards Sustainable Development – AReal Example

Stevan Kjosevski[1], Monika Lutovska[2], Albina Mucha[3]

[1]Faculty of Technical Sciences, Mother Teresa University, Skopje, N. Macedonia, stevan.kjosevski@unt.edu.mk
[2]Faculty of Technical Sciences, Mother Teresa University, Skopje, N. Macedonia, monika.lutovska@unt.edu.mk
[3]Faculty of Technical Sciences, Mother Teresa University, Skopje, N. Macedonia, albina.muca@unt.edu.mk

Abstract: This paper describes goals, process, and results in the effort to introduce new curricula at The Faculty of Technical Sciences of University Mother Theresa – Skopje fully devoted to teach students in the direction of sustainable development. The idea was born in the process of reaccreditation of the old curricula named "Mechanical Engineering and management" at The Faculty of Technical Sciences. The authors of this paper, and the idea for reconstruction were fully aware of the direction Mechanical Engineering needs to go to contribute to the sustainable development of the country and wider. Therefore, that idea led the developing process into new curricula titled: "Sustainable Design in Mechanical Engineering". From total of 40 courses, 15-20 are fully related to sustainable development goals and the curricula includes also a number of projects and diploma work by which students will additionally have an opportunity to add to their understanding and knowledge of sustainable development tools. The new curricula successfully passed the process of accreditation and it is now a part of this

University offer. Based on this curricula, a number of courses for lifelong learning will be developed. It is expected that this curricula will attract attention both of the new students, but also of the professionals at different companies, state and municipality institutions.

Keywords—*curriculum, design,sustainable, development, mechanical engineering*

ExtendedAbstract

How Recommendation Algorithms Know What You'll Like

Mirjana Kocaleva Vitanova[1],Elena Karamazova Gelova[2],andBiljana Zlatanovska[3]

1 Faculty of Computer science, "Goce Delcev" University, Stip, R. N. Macedonia, mirjana.kocaleva@ugd.edu.mk
2 Faculty of Computer science, "Goce Delcev" University, Stip, R. N. Macedonia, elena.gelova@ugd.edu.mk
3 Faculty of Computer science, "Goce Delcev" University, Stip, R. N. Macedonia, biljana.zlatanovska@ugd.edu.mk

Abstract: Predictive algorithm is a statistical technique using machine learning and data mining to predict and forecast likely future outcomes with the aid of existing data. Predictive models are not stable. Predictive models build hypothesis based on what has happened in the past and what is happening now. In the paper we are going to introduce Amazon online store and how algorithms know what we like, so they can recommend products to us. One of the biggest innovations in online shopping - first introduced by Amazon - is automatic recommendation generation. Prediction algorithms are very important for online stores - the more accurate they are, the more online stores will sell.

Keywords—*recommendation, algorithms, Amazon*

Introduction

One of the biggest innovations in online shopping - first introduced by Amazon - is automatic recommendation generation. Log in to the site and, right there on the home page, the site will give you suggestions for products you can buy. For example, if you are a JavaScript programmer, you will see recommendations for programming books that use that language, and if you are a mother of young children, you will see how the site mentions toys and children's books.

This homepage personalization is of great benefit to online stores compared to displaying only the top 10 listings or banner ads: page-through traffic and conversion rates are far higher. Customers are more likely to see and buy the products offered.

Prediction algorithms are of great importance to online stores - the more accurate they are, the more online stores will sell.

Problems that must be solved with such a recommendation algorithm are considered. A big online store like Amazon can have millions of users and millions of items in stock. New customers will have limited information about their preferences, while existing customers may have too much.

The data with which these algorithms work is constantly updated and modified. Customers search the site and prediction algorithms should consider recent item browsing, for example - it does not help if we are looking for a toy for our youngest granddaughter and all we get are jQuery suggestions.

The biggest and most important criterion for these systems (apart from accuracy) is the speed. The recommendation algorithm must generate suggestions within a second or more. After all, the customer is in the process of displaying the homepage of the store where the recommendations will appear.

Traditionally, these referral algorithms work by finding similar clients in a database. In other words, they work by finding a set of customers who have purchased or rated the same items. They throw away

the items you have already bought or commented on and recommend the rest.
For example, if you have already purchased A and B, and a set of such customers also includes C purchases, then C will be recommended for you.

Purposeof Study

The purpose is to see how algorithms for predictions work. There are given some algorithms such as collaboration, client clusters, simple browsing, contents-to-contents, BELLKOR. Then predictions and time are explained. The first strategy was to create a group of predictors.The second strategy used was the realization that time plays a big role in people's ratings.

Finding and Results

In this part the secret of Amazon recommendationis given. Also how does the Amazon referral system work. There is an analysis of the algorithm and a prototype that visualizes the algorithm is given.

Conclusionsand Recommendations

E-commerce is a process of selling and buying items via internet. E-commerce is available 24/7 every day and there are no country barriers. Everyone can buy something from everywhere in the world with some shipping fees. Recommendation algorithms are best known for their use on web sites used for e-commerce. According to customer input they generate list of recommendation products. Amazon used recommendation algorithms to personalize the online store for each customer. The store is based on customer interest, and changes according customer situation. If Amazon know that we work in education, then the recommendation for us will be books, education tools, notes, pens and so on.

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BlertaKondri

Technical Faculty, Mother Theresa University

MirceAcev, no.4, 1000 Skopje

Email: blerta.kondri@unt.edu.mk

ArbreshRaveni

Technical Faculty, Mother Theresa University

MirceAcev, no.4, 1000 Skopje

Email:arbresh.raveni@unt.edu.mk

Economic effects of the Covid-19 pandemic on the global economy

Abstract

The World Health Organization first declared Covid-19 a global health emergency on January 2020, and on March announced that the viral outbreak was officially a pandemic, the highest level of public health emergency. Since then the emergency has evolved into a global public health and global economy crisis. The virus infection spread among and over all countries and affected almost every community, showing the high attachment of the global economy. Since the pandemic began, the global economy has struggled to recover. As infectious cases began to rise sharply, the governments of each country undertook a plan of measures to limit social activities in order to prevent the spread of the pandemic, thus creating a global economic recession. Individually, each of these measures posed a challenge to the global economy, which wakened and reduced the policy flexibility of many nations, especially among leading developed economies. Uncertainty about the duration and depth of the Covid-19 crisis and the economic effects associated with economic policies intended to prevent the spread of the virus have increased volatility in all economies. Thus, the purpose of this paper is to evaluate how much this crisis affected the most important economic indicators using a Global Vector Autoregression (GVAR) model. Finally, we attempt to provide a comparison of the adverse effects of Covid-19 and the ongoing Russian-Ukrainian conflict on the global economy.

Key words: Covid-19 crisis, economic effects, global economy, GVAR, Russian-Ukrainian conflict

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How Big Data Helps to Prevent the Spread of Tuberculosis – A Case Study: SIM TB

Authors: Erzen Krasniqi[1], Vjosa Haxhija[1], Bekim Lajqi[1], and Sokol Morina[1]1
University "HaxhiZeka" Peja, Kosovo,

erzen_krasniqi@hotmail.com, {haxhijajvjosa, bekim.lajqi, infopeja}@gmail.com

Abstract: The service which enables us to use computing as a service across a product is known as cloud computing. Nowadays the cloud computing paradigm has been receiving significant excitement and attention in technological sphere. Cloud computing shares different resources and information between different devices which are located in different places always based on internet connection. According to this, a cloud DBMS is a database management system which acts through cloud computing. Information is important when making decisions. Decisions which are based on gut feeling and made in the absence of evidence always tend to be less effective in most situations. This is also the case when it comes to Tuberculosis (TB) disease control and prevention intervention planning and implementation. The lack of evidence-based information upon which decisions for action to help with the prevention of spread of TB has proved to be less effective in the prevention

of the disease as TB keeps spreading. The aim of this paper was to design and develop a system that would provide TB program managers with information and tools which can be used to make decisions which can effectively influence the fight against the spread of TB through the application of cloud computing, geospatial data analysis and web technologies. The system would improve disease monitoring and tracking through the use of the identified technologies, by displaying the geographical distribution of TB cases in the communities on a mapping application as well as providing reports which TB program managers can use to make decisions when planning and implementing disease control and prevention activities.

Keywords*—Evidence-based; SIM TB; monitoring; cloud computing; geospatial data analysis; information; decision-making; tuberculosis prevention*

Introduction

Introducing the problem and argumenting why this research study undertaken by the researchers is important to be addressed and solved. Explain the gap in the published research regarding the topic, and reference previous research that address this problem or domain.

Purpose of Study

The research study should clearly emphasize the purpose of the study and explain and argument what it's trying to contribute with, and briefly describing its possible contribution/s.

Research Methods

The research method used and the methodology must be clearly stated and described in sufficient detail stating the hypothesis and research questions with sufficient references.

Findings and Results

The expected findings and arguments of the work should be described and explicitly argumented. All the tables, images and figures should be centered. Figures and images should be numbered and figure headers should be placed under the figure or image; as for the tables, they should also be numbered and the table headershouldbeplacedatthetop.References(ifany)ofthetables,figuresandimagesshouldbepresented right under the tables, figures and images in the form of author surname and publicationdate.

Conclusions and Recommendations

Conclusions should include (1) the principles and generalizations inferred from the results, (2) any exceptions to, or problems with these principles and generalizations, (3) theoretical and/or practical implications of the work, (4) conclusions drawn and recommendations as well as future work empathizes.

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Strengthening of Social Dialogue as a Tool of Creating

more and better Workplaces

Authors:Monika Lutovska[1], Vladimir Mijakovski[2], and Albina Mucha[3]
[1]Mother Teresa University, North Macedonia, (monika.lutovska@unt.edu,mk)
[2] University "St. Kliment Ohridski", North Macedonia, (vladimir.mijakovski@uklo.edu.mk)
[3]Mother Teresa University, North Macedonia, (albina.muca@unt.edu.mk)

Abstract: Supporting the participation of institutions in social dialogue advances policy making, but at the same time encourages the practice of regular consultations of Economic-Social Councils (ESC) at the national and local level.This paper aims, through several indicators, to determine the importance of social inclusion for strengthening the capacities for Occupational Safety and Health (OSH) in the Union of Defense and Security (SOB), followed by social dialogue between stakeholders.Through the realized trainings for OSH, the rather low value of only 11.2% for the level of education among the members of the SOB, has been significantly raised to 56.4%. At the same time, the low level of only 22.2% for awareness of the problems in OSH has increased to a value of about 38.6%.Important progress has also been made in the level of education of future trainers, where the value of 4.3% for the continuous education indicator, after holding the trainings, has been raised to 81.5%. After using the services of the legal clinic, the measured value of 2.8% for the availability of information, recorded an increase to a 93% value for this indicator.
The analyzed results and the progress achieved in all indicators shows that social dialogue creates more transparent conditions for social partners, followed by better education for giving quality advice and delivering services based on the demand for creating more and better workplaces.

Keywords*—social dialogue, quality indicator,workplace**, social inclusion, occupational safety and health*

Introduction

In order to maintain and develop the infrastructure of social dialogue, it is necessary to establish a stable practice of the Government and social partners at all levels. Despite some progress in raising awareness of the benefits from social dialogue, one of the main problems at the local level is that the use of Local Economic-Social Councils (LESC) as an effective tool for self-management is still very limited. Thus, the influence of trade unions and employers' organizations is negligible and their capacity remains weak.

Purpose of Study

The most important purpose in this study was, through several indicators, to determine the level of importance of social inclusion for strengthening the capacities for Occupational Safety and Health (OSH) in the Union of Defense and Security (SOB), followed by social dialogue between stakeholders.

Research Methods

Four quality indicators were calculated based on a survey conducted among the members of SOB. Thus, for each quality indicator, a state indicator and a goal indicator were used as input parameters, while the progress indicator was obtained as an output parameter.

Findings and Results

Through the realized trainings for OSH, the rather low value of only 11.2% for the level of education among the members of the SOB, has been significantly raised to 56.4%. At the same time, the low level of only 22.2% for awareness of the problems in OSH has increased to a value of about 38.6%. Important progress has also been made in the level of education of future trainers, where the value of 4.3% for the continuous education indicator, after holding the trainings, has been raised to 81.5%. After using the services of the legal clinic, the measured value of 2.8% for the availability of information, recorded an increase to a 93% value for this indicator.

Conclusions and Recommendations

The collection of data, the summarization of the results and the processing of the feedback was done through the conducted survey and the calculated indicators, but also through the opinions of the members of SOB who were present at the trainings. Of course, a higher level of awareness of OSH problems was achieved, better information was provided to those present, the level of education was raised and a continuous opportunity for information was provided through future trainers. Also, the establishment of the legal clinic ensured the provision of free legal assistance and advice in relation to OSH even after the end of the project.

Such a concept of social inclusion of stakeholders in OSH problems ensures a more intensive social dialogue whose main goal is to create better workplaces that will provide better quality and dignified working conditions.

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Extended Abstract

THE CHALLENGES AND OPPORTUNITIES OF NORTH MACEDONIAN COMPANIES DURING THE TRANSITION FROM OHSAS 18001 TO ISO 45001

Authors: Albina Mucha[1] and Monika Lutovska[2]

[1]Mother Teresa University, North Macedonia, (albina.muca@unt.edu,mk)

[2] Mother Teresa University, North Macedonia, (monika.lutovska@unt.edu,mk)

Abstract: This paper is focused on identifying and analyzing the challenges and opportunities that North Macedonian companies faced while migrating from OHSAS 18001 to ISO 45001. The most common challenges identified were the lack of expertise, corporate culture, cost, low top management support and the redefinition of health. These challenges were pretty similar to the ones companies in other countries faced. On the other hand there were opportunities that arose during this transition such as proactive approach and the redefinition of health, but there were some companies that didn't recognize any opportunities. The proactive approach is one of the differencing elements between OHSAS 18001 and ISO 45001, which results in implementing preventive measures that lower the number of work related injuries, which is the main goal of any Occupational Health and Safety Management System.

Keywords— *sustainable development; awareness; high school students*

Introduction

The pandemic extended the deadline for the transitioning process from OHSAS 18001 to ISO 45001, a few times and the last extension was January, 2022 which gave companies a period of almost four years to complete this process fully and in an effective manner. The main differences between this two

standards were the approach, 45001 has a way more proactive one versus the OHSAS approach which is consider to be more reactive, as well as the scope in which the term health was defined, OHSAS had a traditional meaning that only includes physical health while ISO 45001 has expanded the definition to include mental health. Every process that acquires a major change can bring its share of challenges especially for companies, which already have significant challenges while operating in developing countries such as North Macedonia.

Purpose of Study

The main purpose of this study is to identify the biggest and most common challenges for North Macedonian companies, establish whether any opportunities have emerged during the migration from OHSAS 18001 to ISO 45001, and if so what were these opportunities.

Research Methods

The main research method was a questionnaire that included a necessary listing of all the challenges that their company faced during the transition process from OHSAS 18001 to ISO 45001, as well as evaluating through a numerical scale from one to five to evaluate the most difficult challenges, where five is used to mark the most difficult challenge. The research aimed at exploring whether the people involved in this migration identified any opportunities and what they were.

Findings and Results

After questioning 13 companies in North Macedonia the five most common challenges that they faced during this transition are as listed on figure 1, as well as the percentage of North Macedonian companies that have listed it as a challenge.

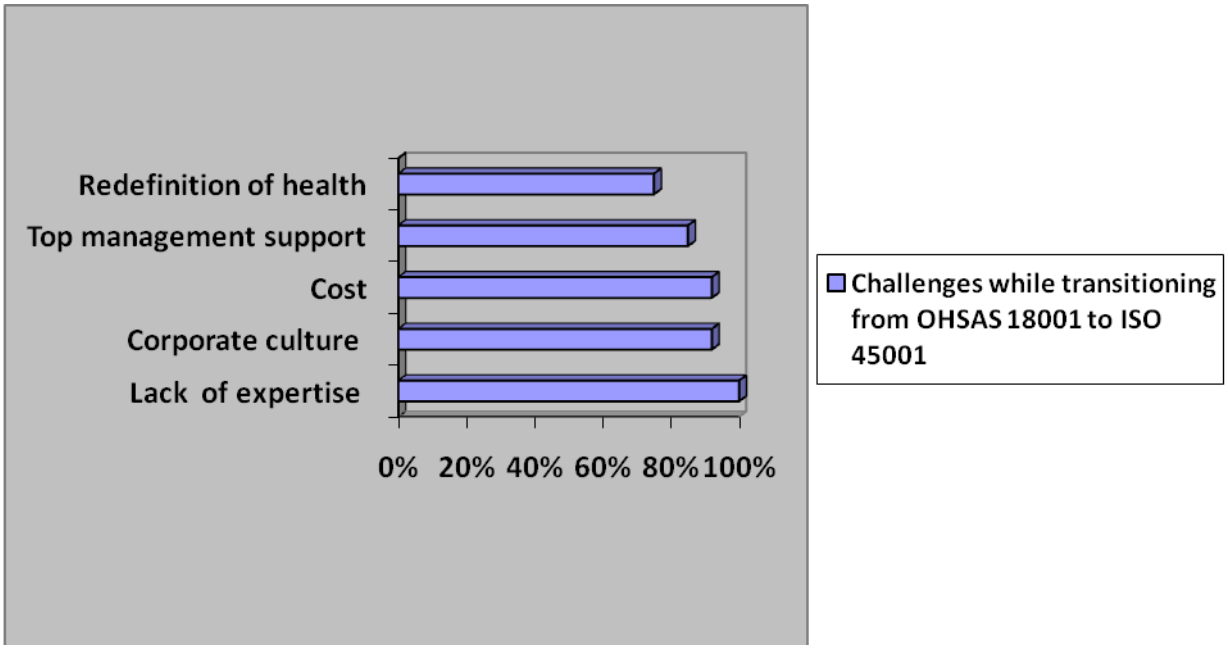

Figure 1 – Challenges while transitioning from OHSAS 18001 to ISO 45001

The summarized ranking of the challenges previously listed are presented in figure 2.

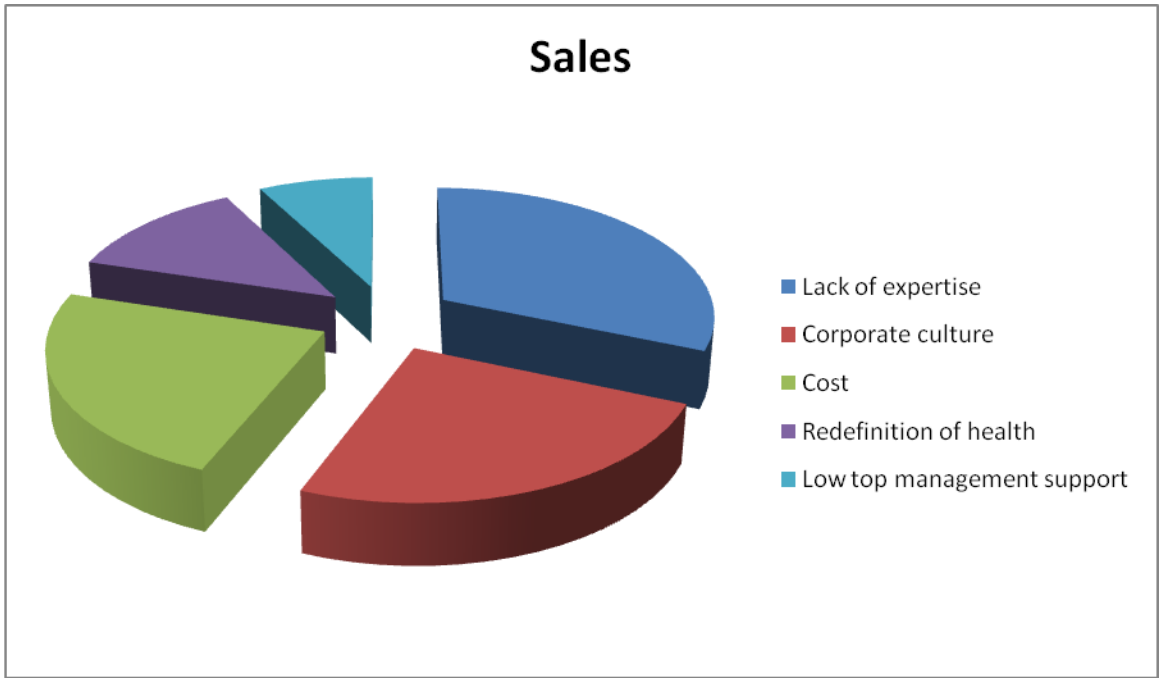

Figure 2 – Ranking of the challenges faced during the migration process from OHSAS 18001 to ISO 45001

The opportunities the companies identified are presented in figure 3.

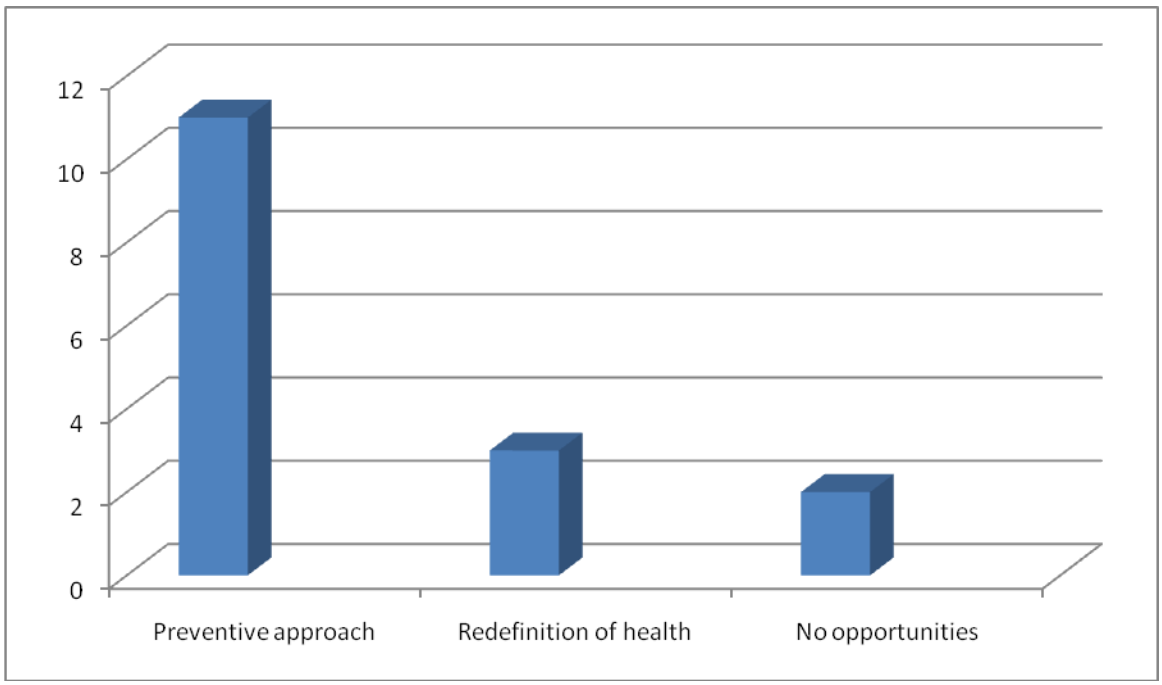

Figure 3 – Opportunities identified during the transition process from OHSAS 18001to ISO 45001

Conclusions and Recommendations

The research suggests that in general North Macedonia's companies, as few as they are, faced more or less the same challenges as most of the companies around the globe that have went through the process of transitioning from OHSAS 18001 to ISO 45001. The biggest challenge, the lack of expertise is to be expected if we take into consideration the fact that ISO 45001 is a new standard. Cost, low top management support and corporate culture are well known challenges that appear during the implementation of ISO standards. The surprising element is that redefinition of health is viewed as a challenge, as well as an opportunity. The companies that viewed it as an opportunity have learned that a productive employee needs to be mentally healthy; therefore a standard that guides the process of implementing policies and procedures that focus both on mental and physical health will bring considerable benefits for the companies. The main opportunity identified is the preventive approach which is the best way to preserve the health of the employees as well as lower costs for companies.

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Extended Abstract

EVALUATION OF NORTH MACEDONIA'S HIGH SCHOOL STUDENT KNOWLEDGE ABOUT CLIMATE CHANGE AND RENEWABLE ENERGY

Authors: Albina Mucha[1] and Monika Lutovska[2]
[1]Mother Teresa University, North Macedonia, (albino.muca@unt.edu,mk)
[2] Mother Teresa University, North Macedonia, (monika.lutovska@unt.edu,mk)

Abstract: This paper is a result of a project that aims to raise the awareness and enrich the knowledge of high school students regarding renewable energy as one of main aspects of sustainable development. In order to build an appropriate program structure it was necessary to assess the current level of awareness and knowledge about sustainable development. Therefore the main intent of this research is to establish a clear picture of the degree of information students have about sustainable development, including its definition and goals, as well as their knowledge of the different types of renewable energy sources, the basic principles of their functioning, their benefits and shortcomings, how much they are present in our country. The research was also focused on analyzing whether there is a connection between areas of living and gender and the level of their knowledge.

Keywords— *sustainable development; awareness; high school students*

Introduction

The current data about climate change suggests that the amount of time we have left for a point without any return is getting considerably short. Therefore it is important to focus on the awareness and knowledge of the youth about all matters related to sustainable development in order to give them the necessary means for a proactive approach needed to expedite and implement the changes towards a more sustainable lifestyle in a local and global level.

Purpose of Study

The main purpose of this study is to assess the degree of information and understanding of high schools students of public schools in Skopje about sustainable development. This assessment aims to construct the basis for the necessary changes in the educational programs that will increase the awareness and knowledge of the students.

Research Methods

The research method used was a questionnaire about the definition of sustainable development, its goals in addition to the types of renewable energy sources they have encountered and how they function, the amount in which they are present in our country and a scale of how urgent and serious the matter of climate change is according to them.

In order to have comprehendible results we established a basis for correct answers regarding the questions that require a definition of a term and labeling goals or advantages/disadvantages of an energy source.

The definition of sustainable development that we chose while considering two criterias such as:

- simple enough to be remembered by students
- contains enough elements to define it completely and correctly

is the one from the Bruntland Commission Report in which sustainable development is considered as development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

- The goals of sustainable development that we focused are the ones that UN members agreed upon in 2015 as part of the 2030 agenda:
- Eliminate Poverty
- Erase Hunger
- Establish Good Health and Well-Being
- Provide Quality Education
- Enforce Gender Equality
- Improve Clean Water and Sanitation
- Grow Affordable and Clean Energy

- Create Decent Work and Economic Growth
- Increase Industry, Innovation, and Infrastructure
- Reduce Inequality
- Mobilize Sustainable Cities and Communities
- Influence Responsible Consumption and Production
- Organize Climate Action
- Develop Life Below Water
- Advance Life On Land
- Guarantee Peace, Justice, and Strong Institutions
- Build Partnerships for the Goals

As part of the research we developed hypothesis about the correlation between gender and level of knowledge about sustainable development, as well as area of living and level of knowledge about sustainable development which were tested using a Chi square test. The Chi square test was selected as our sample size was bigger than 50 which is the recommended area of implementing this method as well as the fact that we were testing a correlation between two categorical variables.

Findings and Results

The number of complete questionnaires that were collected was 124. Out the surveyed students 57 % were female and 43% male, of which 68.5 % lived in rural areas and 31.5% in urban areas.

In order to define a general level of knowledge the initial question about sustainable development was whether they have ever heard about the term sustainable development, on which a great majority, 85%, of the students replied with no, and only 15% or only 19 of the 124 students surveyed answered with yes. The following question about how they would define sustainable development gave a clearer picture of their actual knowledge of the issue as presented in table 1.

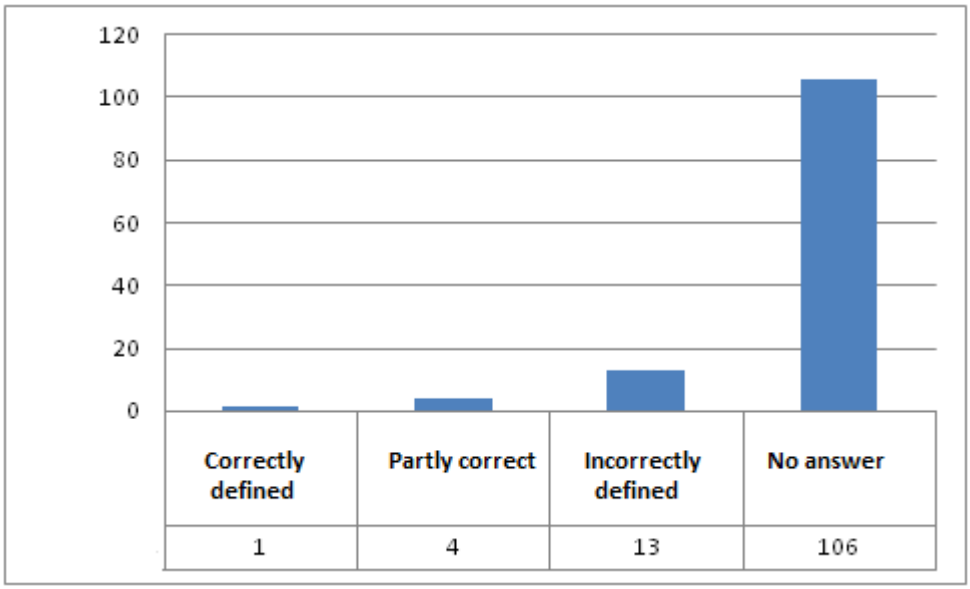

Table 1

The situation is similar with Table 2 that expresses the number of students that have correctly labeled the goals of sustainable development.

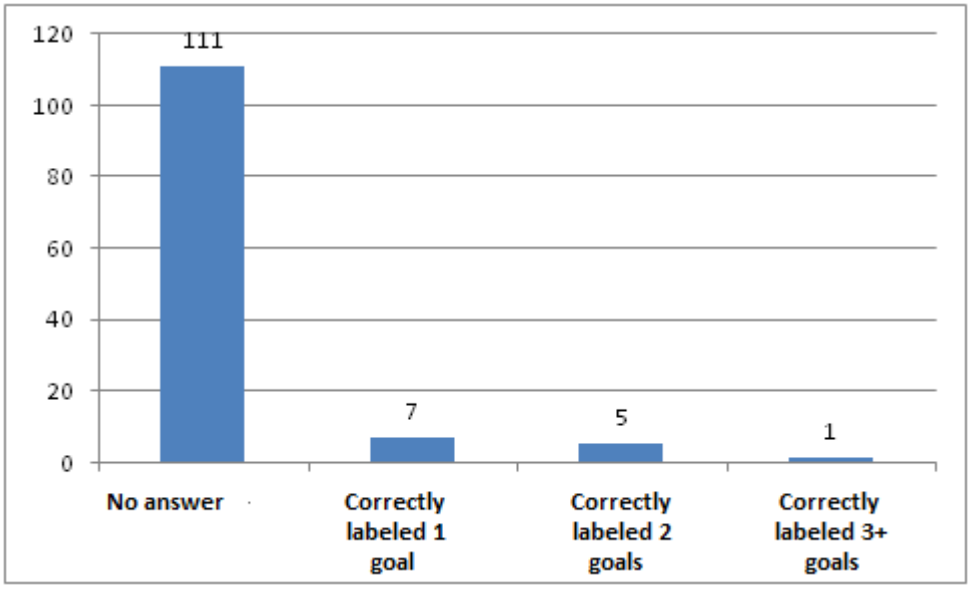

Table 2

The knowledge of renewable energy sources was mainly about solar and wind energy, with a limited knowledge of their basic principles, along with almost no knowledge of other types of renewable energy sources. In general all the answers regarding the level of information students have about the energy component of sustainable development show the same low level of knowledge which concurs with our initial hypothesis.

On the other hand, even though they don't possess a lot of information about different aspects of sustainable development their answers presented in table 3, about whether they believe that climate change is an urgent matter or not, portray that the level of alertness among students about the urgency of a necessary change was higher than our initial hypothesis suggested.

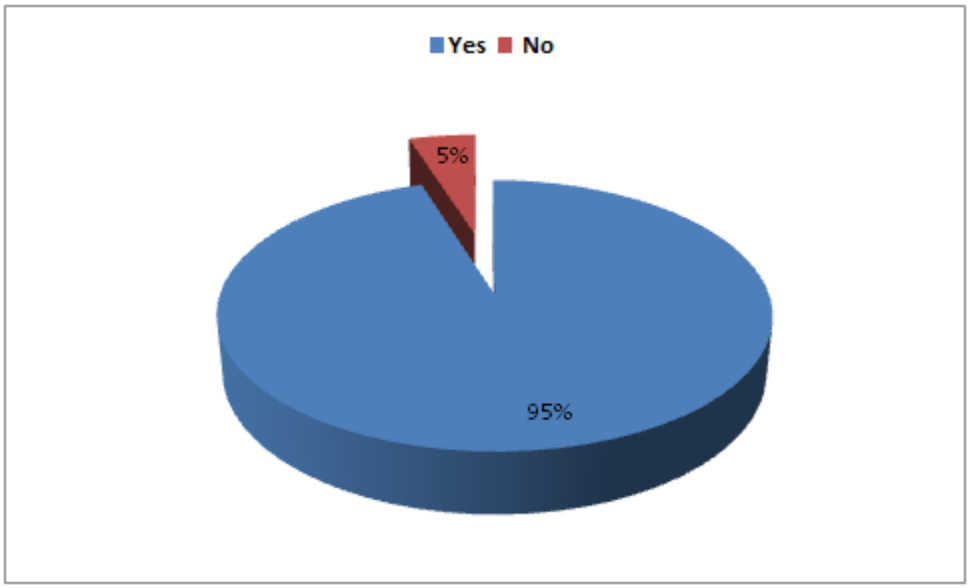

Table 3

The data was used to test two hypotheses:

1. H_0: There is no correlation between gender and the level of knowledge about sustainable development
2. H_0: There is no correlation between area of living and the level of knowledge about sustainable development

The results from the chi square test about the first hypothesis confirmed our initial hypothesis within this sample size, while the results about our second hypothesis showed that there is a correlation between area of living and the level of knowledge about sustainable development.

Conclusions and Recommendations

The research suggest that high school students are aware and alerted about the urgency of the matter yet lack the necessary knowledge and education about sustainable development which means they lack the appropriate tools to contribute and use their potential for innovation and personal changes that would help accelerate the process of achieving the goals of sustainable development. Consequently the

importance of developing an appropriate theoretical and practical knowledge through formal and informal education is more than necessary.

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ANALYSIS OF SURVEY REGARDING OSHKNOWLEDGE IN AGRICULTURE IN DEBAR, NORTH MACEDONIA

Authors: Noli Osmani[1], Monika Lutovska[2] andAlbina Mucha[3]

[1]Faculty of Technical Sciences, "Mother Teresa" University, Skopje, NMK, (noli.osmani@students.unt.edu.mk)
[2]Faculty of Technical Sciences, "Mother Teresa" University, Skopje, NMK,(monika.lutovska@unt.edu.mk)
[3]Faculty of Technical Sciences, "Mother Teresa" University, Skopje, NMK,(albina.muca@unt.edu.mk)

Abstract: Agriculture is one of the most important economic components of a society, unfortunately accompanied by many casualties related to occupational risks and hazards. The main object of this research is to present the current state of knowledge regarding safety and health at work in agriculture among farmers in the city of Debar. Research is done through questionnaires, observation and interviewing of farmers,in order to interpret a part of the safety and health at work is presented to people who deal with agriculture, based on the basic knowledge of safety and health for agriculture.There are many dangers found on farms. Most of them are ignored, which can cause the farmer to suffer later in terms of ill health, possible injury or death.

Key words:*occupational safety and health; agriculture;awareness; analysis; farmers.*

Introduction

Numerous studies in the field of agriculture worldwide, indicate the high risk associated with this sector in the field of occupational safety and health (OSH),[1].While considering farming as a very important activity in the human society and development, farmland accounts for 47% of the European territory and ½ of the territory of the Republic of North Macedonia, where agricultureas asector, accounts for 11% of the national GDP,[2,3].

Being a farmer is not an easy job, in fact, according to statistics published by the National Institute for Occupational Safety and Health (NIOSH) in the United States of America,it is one of the most hazardous occupations. Agriculture ranks among the most hazardous sectors wherefarmers are at very high risk for fatal and nonfatal injuries; and farming is one of the few industries in which family members (who often share the work and live on the premises) are also at risk for fatal and nonfatal injuries,[4,5].

Purpose of Study

The purpose of this study is to analyze and assess the knowledge of farmers in the city of Debar, North Macedonia, regarding the occupational safety and health.Farming is considered to be amongst the most hazardous occupations because farmers are exposed to a wide range of occupational hazards, on a daily basis. The daily job of a farmer usually consists of labor-intensive physical activities which often happen in unfavorable conditions, [6]. According to F.K. Ewete, it has been postulated that occupational health and safety issues in agriculture arise not only because of existing hazards, but also because of illiteracy, ignorance, lack of use or understanding of personal protective equipment, inadequate or non-existent training, and/or misinformation, [7].

Research Methods

Research was conducted on a number of workers in the agricultural sector and their family members in the region of Debar, North Macedonia. The study population consists of 30 respondents where interviewees were divided into 3 groups: Owners, Family members and Workers. Further, the data were analyzed and divided into different subgroups according to: age, occupation, exposure and level of OSH awareness.

This study was conducted over a period of 30 days, during the months of July and August 2022. The questionnaire was divided into four parts to collect information related to the socio-demographic profile, knowledge, behavior and perception. Also included are questions regarding chemical risks that come as a result of work, and awareness of chemical exposures, ergonomic risks, occupational risk due to sun exposure, as well as the health consequences of these risks and the use of personal protective equipment.

Findings and Results

The purpose of the research is to understand the level of education, behavior and perception of the workers towards the various risks that come from work in agriculture, as well as the evaluation of awareness about OSH. The results in this study are presented in tables and graphs which are based on the objectives of the study.Based on the data obtained from questionnaires and interviews, the survey included 30 interviewees aged from 0 to over 61+ years old. The largest number (63.3%) of workers were male.

The age distribution from the findings shows that the labor force in agriculture is relatively middle-aged.

The majority of farmers have high school education (53.3%) participationwhile 33.3% of the surveyed farmers had only context.The evaluation of these characteristics was the key factor for this study as these factors can influence workers in the decision whether they will be more careful or not while performing their activities.

Different studies show that farmers lack necessary knowledge in matters of safety and health at work and as a result fail to comply with the legislations and regulations for OSH, [8]. According to the results we see that the majority (93.3%) of the respondents had no knowledge regarding the Law on Safety and Health at Work in North Macedonia.

Regarding the consequences of reusing chemical bottles, 73.3% had no knowledge and only 26.7% had knowledge. Only 33.3% knew how to reduce/prevent the harmful effects that chemicals can have on health and 66.7% did not know how to prevent the harmful effects that chemicals can have.

Based on the employees' attitudes towards safety and health, it is observed that the majority of respondents (56.7%) had a neutral opinion about the importance of personal safety when compared to their daily work, where instead of answering that their personal safety is the most important thing, they could not put their safety in front of their occupation, which means that they would accept to continue working in a high-risk environment, regardless of the risks involved. As for the workers' attitude towards safety in general, the majority remained neutral to the questions posed to them.

Conclusions and Recommendations

Agriculture is considered one of the professions with a high degree of danger, especially in developing countries such as North Macedonia, where more work is needed in the field awareness and education of workers regarding OSH. From the obtained results, the majority of agricultural workers were men, which means that females have a lower participation in this sector. Also, the majority of the respondents belonged to the family workers category, who contributed to family farms, it should be noted that the majority of the interviewees that were women, belonged to this category of workers, often, as the wives of farmers, or as their daughters.

Most of the respondents had completed high school, but a significant number had completed only primary school and the number of uneducated workers is low. According to the findings there is a correlation between the level of education and knowledge of farmers in terms of safety and health at work, since most of the respondents had no knowledge of the Law of safety and health at work in North Macedonia, the lack of knowledge about the laws may affect adversely the accidents rates.

From the conducted analysis, it is observed that there is a lack of attention regarding personal health.Farmers often choose to ignore their health compared to their occupation, and the idea of collective safety during daily workis missing, where employees, in addition to themselves, must also take care of the well-being of their colleagues and not look up only for themselves. The fact that 43.3% of the interviewees belonged to the category of family members is particularly worrying, because some of them might be under the age of 5, and are involved in agricultural work. This gives the answer to why injuries and even fatal accidents occur very often, where children are the victims.

It is worth noting that the farmers had satisfactory knowledge about working in the sun and preventing the harmful effects of working in the sun, as a result of the knowledge passed down from generation to generation, but there is still a need for professional training on this topic.

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Learning mathematics using digital tools
- digitization of the materials for learning -

Authors: Tatiana A. Pachemska [1] , Dobri Jovevski [2] , Violeta Popovska [3] and Zoran Trifunov [4]

1. Goce Delcev University, Stip , Republic of North Macedonia, tatjana.pacemska@ugd.edu.mk
2. "Ilinden" Municipality Primary School, Kriva Palanka, dobri.jovevski@gmail.com
3. "Vera Jocikj " Municipality Primary School, Gazi Baba, Skopje, popovskaviki@yahoo.com
4. Mother Teresa University, Skopje , zoran.trifunov@unt.edu.mk

ABSTRACT

Keywords: *Digitization, mathematics, education, educational process, teachers*

Introduction

Today, in the modern way of living, digitization in the educated system enables developing the logical thinking where students, enriching knowledge, improving skills, attitudes and values, on the one hand, but also professional development, and motivation of teachers, on the other hand.
Society should provide satisfaction of their needs, on the current generation without yes them threatening future generations in satisfaction on theirs needs , and thus it is necessary to look - one step ahead- and satisfy the needs of students and teachers.
Sustainable development in education implies the integration of the key questions in teaching and learning. Thus, the stimulation of critical thinking among students, the solving of logical tasks based on analyses, and the motivation for undertaking activities and solving problems, enable sustainable development in education.

Purpose of Study

The modern way of life and the constant technical-technological development imposes the need for formatting the educational process, with the aim of raising the quality and following the challenges of the new era - digitalization.
Based on the above, the purpose of the research is derived, which is to analyze the situation in relation to innovations in education and to examine the need for digitization in the field of mathematics.

Research Techniques and Methods

The research was conducted using the Survey technique, using Survey sheets as research instruments.
The analysis was made using quantitative methods with a percentage representation of the given answers, as well as qualitative methods, describing the need for learning mathematics with the help of digital tools, using a descriptive method.

Findings and Results

The paper contains data about the digitization process in the subject of mathematics, first as a need, and then as a challenge and trend in the new era, offering quick access to a lot of information, it's processing, selection of data, as well as a quick and easy check of acquired knowledge among students.

The research includes fifth-grade students and their parentsandthe teachers, selected in order to see the piloting of digitalization in the past school year, among other things, the experiences and benefits of the process, looking from different aspects, students, teachers, and parents.

The research was conducted in 20 primary schools from different regions in the Republic of North Macedonia.

Conclusions and Recommendations

The analysis of the research data points to the fact that digitization in the subject of mathematics is necessary with the new changes in the educational process, which means it is not a trend, but a need for both teachers and students.

The help of digital tools encourages digitization of the materials for learning everything enabling faster access to information and its processing. This is the only way to face a new era and respond to new challenges in the educational process, especially in the teaching of mathematics.

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Impactof COVID-19 Pandemic on Organizational Behavior andMentalHealthofEmployeesinHigherEducationInstitutions

MSc Sanja Pavlova [1]

[1] Faculty of economics, European University- Skopje, Republic of North Macedonia,(pavlova.sanja8@gmail.com)

Abstract: The motive for writing this article is to connect the relationship between the COVID-19 pandemic, the organizational behavior and mental health of employees in higher education institutions. Such as, the impact that this pandemic has on every segment of the functioning of one higher education institution.In January 2020, the world saw the spread of a new virus known as Covid-19. The impact of this virus has produced a pandemic that has spared no country (Khaoula, Jalal, 2021). In course of COVID-19 pandemic, learning and teaching environments soon started to change on a dramatic scale for all stakeholders, like students, teachers, educational leaders, educationalists, due to the restriction strategies adopted and imposed by national governments in many parts of the world (Karakose, 2021).Organizational behavior in higher education often has a standard structure, such as Rector, Vice-Rector for teaching, Dean, Vice Dean, Full Professor, Associate Professor, Assistant Professor, Teaching assistant and others administrative figures. All these individuals are responsible for setting the tone in the institution, especially in times of changes, such as pandemic of COVID-19. Lack of leadership or ethics can come from the very top, which can create fractures in the institution.From the beginning of online teaching in March 2020 due to COVID-19 pandemic, all staff was under a high degree of stress. They were faced with the enormous challenge of adapting to the new way of realizing teaching. Teaching work is stressful, which means experiencing negative emotions like anger, anxiety, tension, frustration, depression. Changes in teaching methods and the lack of guidance for new teaching challenges have created great uncertainty in this sector.

Key words: COVID-19, organizational behavior, mental health, higher education, institutions

Designing line coordination of the signal plan on the Boulevard

"St.Kliment Ohridski" in Skopje

Authors: Olivera Petrovska[1], Ivica Stoilovski[2], Andon Petrovski[3],

1 University Mother Teresa Skopje, Republic of North Macedonia, (olivera.petrovska@unt.edu.mk)

2 PE Parking of the Municipality Center, Republic of North Macedonia,(stoilovskiivica@gmail.com)

3 24 ING dooel Bitola, Republic of North Macedonia, (24ingbt@gmail.com)

Abstract: Traffic guidance and control is a series of procedures, measures, restrictions and means used by traffic engineers in order to meet the needs of users of transport services, as well as to increase the level of safety.To ensure quality travel conditions in urban areas, it is necessary to go one step further. On the routes where several consecutive intersections are controlled by light signaling, at high current densities the control becomes ineffective and a counter-effect is obtained. Therefore, it is necessary to connect the individual light signals in a system that will work as a whole and ensure the progressivity of the main current. Connecting the light signals in a system for their coordinated operation is known as coordination.In the paper, a procedure for introducing the coordination of light signals at five intersections on the Boulevard "St. KlimentOhridski" in Skopje. The methodological procedure for creating a coordinated operation of the light signaling is shown in detail.

Keywords*—traffic light, coordination, traffic control*

Introduction

Traffic guidance and control is a complex discipline, especially for urban environments. There are four levels of traffic management: right-hand rule, management of horizontal and vertical signaling, with the help of manpower and with the help of light signals. Conventional measures become ineffective under high traffic demand, resulting in large time losses and creation of traffic jams.
The highest hierarchical level of traffic management (light signals) is dysfunctional when there is high traffic demand, especially if the light signals operate in isolation.From an environmental point of view, line coordination contributes to reduced fuel consumption and reduction of exhaust gases in already suffocated urban environments.

Purpose of Study

The subject of the paper is the functioning of the light signaling at a series of intersections on the Boulevard "St. KlimentOhridski" in Skopje, and the goal is to design a coordinated system of light signaling for the defined move.

Research Methods

To achieve the set goal, a series of methodological procedures (steps) are presented that lead to the fulfillment of the goal of this research, i.e. projecting a "green wave" along the Boulevard. Also, the coordination of the move was done in the TRAFFIC SYNCHRO STUDIO software to show visually how the green wave actually progresses along the Boulevard.

Findings and Results

Projecting of line coordination for the Boulevard "St. KlimentOhridski" is also done in the SYNCHRO

software. The software helps to visually show how the coordination of light signals works, as well as show the performance of individual intersections and of the total move.

Conclusions and Recommendations

The coordination of the operation of light signals is a more sophisticated and refined way of managing traffic at a series of intersections that are controlled by light signals.

During the design of line coordination of the move along the Boulevard "St. KlimentOhridski" we came to the conclusion that it is best to use a progressive signal plan.This measure results in a reduced number of vehicle stops, reduced time losses for passengers, an increase in the capacity of the coordinated move, an increase in the mobility of road users, an increased level of service, etc.

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Extended Abstract

A Sustainable Method for Textile Colouring Using Natural Dyes

Olga Popovska, Arjan Ganiji
Faculty of Technological Sciences at "Mother Teresa" University in Skopje, Republic of North Macedonia
(olga.popovska@unt.edu.mk), (arjan.ganiji@unt.edu.mk)

Abstract: The natural dyes from tea, carrot, beat, red cabbage, carry, coffee, pepper which are commercially available are widely used in textile colouring. The chosen material, cotton with 10x10 cm was used as a material for the analysis. The solution of 2% was prepared for each plant material as a sample. The piece of cotton material was rinsed in the solution at temperature of 100 °C in the period for 30 min. The fixation of the colour was carried out using 3–4 drops of acetic acid. The material was coloured where obtained results showed that dark colours were more stable during the time then pale colours using carrot and beet. The method can be used as an alternative eco-friendly method for textile colouring.

Keywords—*natural dyes, coffee, carry, tea, cotton*

Introduction

Although with poor bonding characteristics in the connection with textile fiber, natural colours are considered to be eco-friendly.[1,2] In this study, natural dyes from various plant materials were utilized in order to obtain coloured textile material with different colour intensity and to see how the colour was changed with the time. The dyes extracted from natural materials such as plants, animals, and minerals have positive properties in terms of low or are without toxicity for humans and for nature.[1] The process of colouring is often applicable on natural fibers such as cotton, wool, silk, linen.[1] The colour intensity and depth depend on presence of chomophoric or auxochromic groups in the chemical structure. For example, one of the main compounds in teas are tannins which are complex polymeric polyphenols containing aromatic ring structure.[2-4] The aqueous extraction method is used for achieving larger contact area in order achieving the best material colouring. The fixation was done with the use of acetic acid in the proces.[3] The use of natural colours somehow can be a challenge because of fading the colour with the time.

Purpose of Study

The goal of this study was to use natural dyes and pigments from various plants such pepper, coffee, carry, carrot, red cabbage, beet, and tea. The main idea of this research was to introduce eco-friendly dyes in the process of dyeing of the textile. Moreover, the conditions for dyeing were developed such as time, temperature, and colour fixator in order to obtain final product where the dye will be stable and will not fade with the time.

Research Methods-Materials

Samples of tea, pepper, coffee, carry, carrot, red cabbage, beet, and vinegar were purchased from the local market. The material which was used in the analysis was cotton (100%), chosen as a primary dying material in the textile and it was also bought from the local market. A solution of 2% for each sample was prepared. An analytical balance on analytical balance (VWR LA 124, Austria) with 0.1 mg accuracy was used in the analysis.

The test cotton piece of sample with dimension 10x10 cm was immersed in 2% solution of each extracted plant material as a sample. Acetic acid was used for dye fixation on the material. The best colour was observed after 30 min at 100 °C where the dye achieved its the biggest effectiveness.

Findings and Results

The natural dyes from plant materials can be used for textile dyeing. The colour was more stable using dark dyes then using dyes which are natural pale pink or orange. The best results according to the colour stability was found using coffee or tea, while the least stable colour results were obtained using carrot as a natural dye.

Conclusions and Recommendations

The colours from plant material can be used in the process of textile dyeing. Although not all of the colours are stable with the time and the material had tendency to fade with the time, it can be characterized as a good trial in obtaining a sustainable method in textile dyeing using natural dyes.

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The standard of living as a challenge in the care of the elderly

Authors:HavaRexhepi[1],Daniel Pavlovski[2],Aleksandar Petkovski[3],

1,University "Mother Theresa", North Macedonia,hava.rexhepi@unt.edu.mk

2,University "Mother Theresa", North Macedonia,daniel.pavlovski@unt.edu.mk

3, University "Mother Theresa", North Macedonia,aleksandar.petkovski@unt.edu.mk

Abstract:

Old age is the period beyond person's retirement. Entering retirement for many old people represents a period that surprises them, confuses them and often finds them unprepared to organize and fill life with meaningful content. Since the elderly enter this period unprepared, they are not able to face the new challenges, such as the decrease of financial resources, the new roles in the family, the need for greater and more organized care for their own health, the need for living socially active life, and the challenge of organizing the large quantity of free time. Social care for this population is largely at an unenviable level. Contemporary Macedonian society is confronted with a lot of challenges often placing the problems of the elderly citizens at the margin of social issues requiring immediate attention.The research part of this scientific paper refers to the presentation of own research with a multi-dimensional stratified sample of the elderly who, with the help of a suitable survey sheet, studies the problem through several basic headings, namely, socioeconomic conditions, challenges in the contemporary living of the elderly and analysis of the conditions and challenges of the elderly.The analysis of the obtained data is presented in tables and graphs with appropriate statistical processing. These data represent a basic novelty and a contribution to the work that we expect to be used in the analyzes of the respective institutions and an occasion for further research in that direction.We expect this paper to represent a modest but significant contribution to the advancement of knowledge of a significant part of the conditions and challenges of the contemporary living of the elderly and an incentive for appropriate implementation by the appropriate services in the Republic of North Macedonia.

Keywords—*old age, existential situation, challenges, social concern*

Introduction

Old age is the period beyond person's retirement. Entering retirement for many old people represents a period that surprises them, confuses them and often finds them unprepared to organize and fill life with meaningful content. Since the elderly enter this period unprepared, they are not able to face the new challenges, such as the decrease of financial resources, the new roles in the family, the need for greater and more organized care for their own health, the need for living socially active life, and the challenge

of organizing the large quantity of free time. Social care for this population is largely at an unenviable level. Contemporary Macedonian society is confronted with a lot of challenges often placing the problems of the elderly citizens at the margin of social issues requiring immediate attention. In North Macedonia researches related to different aspects of elderly care are scarce. Hence, we the teachers at the Department of Social Studies at "Mother Theresa University" are making an effort to conduct systematic research work that will produce credible data to be used by lobbyists and policymakers when drafting policies or legislation intended at improving or alleviating the financial constraints of the elderly people.

Purpose ofStudy

Theresearchstudyshouldclearlyemphasizethepurposeofthestudyandexplainandargumentwhatit'stryingtoco ntributewith,andbrieflydescribingits possiblecontribution/s.

The purpose of the study is to find out whether elderly people manage to address their subsistence needs based on their pension, and for those who have hard time to do so, the authors are trying to find out what tactics do the elderly people deploy in order toaddress their subsistence needs. The findings are intended to enrich the scarcely available data on socioeconomic status of the elderly people and possible be utilized by state or other relevant entities with purpose of boosting their efforts on achieving advancements of the socioeconomic status of the elderly people.

ResearchMethods

The research method consists of stratified questionnaire deployed on 600 respondents over age of 60, coming from four towns in North Macedonia: Skopje; Kumanovo; Kichevo; and Strumica. The respondents were interviewed in ambulances, daily care centers for elderly people, and retirement homes. 430 out of 600 respondents are living in households, while 170 in retirement homes.Framework analysiswas used for analyzing gathered data.

The main hypothesis centers around the assumption that the elderly people do not generate enough income to service their existential needs. Hence the research question will dwell within the realm of finding out what the priority areas areto spend their money on, and what are the tactics/approaches that the elderly people deploy in their attempt to try to have their existential needs satisfied.

Findings and Results

The results show that the monthly pension-based income does not suffice for vast majority of the respondents. With regards to the structure of their spendings, food and medicines are the two leading categories followed by utility costs. A common denominator for all our respondents is the fact that they don't have any funds remaining to be spent on social, cultural, entertainment or other alike activities.

With regards to the respondents who reported that their income does not suffice even for servicing their basic needs, the most common approach they use is living in larger household and thus shearing subsistence fees with other family members.

ConclusionsandRecommendations

As a conclusion we can point out that the pension-based incomes are not sufficient in order to provide dignified living for the elderly people, especially with regards to allowing them the ability to be able to service their basic (substantial) needs.

The increase of pensions for the elderly people would have been a logical suggestion, but not a viable one. Therefore, our recommendation would rather go in direction of creating opportunities for part time employment of the elderly people. Many of them are still willing to work and if we take into consideration the negative demographic trends and the lack of labor force, it seems that the economy can benefit from both the experience and the skills of many of the elderly members of our society.

Of course, we are aware that the model we suggest has its limitations especially bearing in mind that the increase in age is proportional to the decrease of the ability to work, but nevertheless the establishment of a viable model for engaging the elderly in part time professional activities beyond retirement will definitely contribute toward alleviation of the financial constraints of a significant percentage of this population. And on the other hand the state might explore the possibilities of introducing additional small financial subsidies for those citizens who do not have the ability to work beyond their retirement age but find themselves in need for a small financial support that will help them generate enough income to be able to service their basic subsistence needs.

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Ass. Prof. Dr. Miki Runtev, PhD of economics,
direction of international financial management,
European University in Skopje
miki.runtev@yahoo.com

The dynamics of digitization on financial markets in pandemic conditions

Abstract: The motive for writing this paper is to answer the question of how digital technology has moved and how it has so far affected the digital financial markets in conditions of severe turbulence caused by the Covid 19 pandemic. But, also to answer how much the opportunities and means for the advancement of digital technology and digital financing have affected the

markets. Various motives are the cause of the international tendencies, changes and effects of the movements of the global digitization of the international financial markets.

This paper connects the issues of the relationship between financial globalization, financial liberalization to financial integration on the one hand and on the other, by monitoring and analyzing the movements of digitalization of financial markets and their transformation.
Due to this purpose, in general, the work is divided into two parts, which include the theoretical structural-methodological studies. Namely, the role, problems and conditions of global processes that characterize the impacts of digitization on the markets are described.

Further, how digitalization will reshape financial markets and monetary systems, and how digitalization of finance will affect the way markets are financed today, but what are the biggest opportunities, barriers and impacts related to digitalization.?

The basic research question is what tendencies and movements the digitalization of the financial markets faced until today and what impact did the digitalization have after the major market turbulences caused by the pandemic.

The purpose of this paper is to show the structure and dynamics of digitalization of financial markets, how they moved and what kind of transition process they went through in underdeveloped countries in comparison with developing countries and developed countries.

Also, in the paper, the advantages and disadvantages of the digitization era of the financial markets are highlighted. In addition, the paper aims to emphasize the reasons for the ascertained turbulences as well as to indicate the possible future courses of action. Of essential importance was the need to adjust various elements in the domestic policies of the countries towards global movements, which affected the overall conditions for the development of digital international trade.

The following results are expected from the research: greater correct conceptualization of underdeveloped digital economies that will be able to create new high-quality institutions and that will help stimulate the introduction of innovations.

Keywords: digitalization of financial markets, financial globalization, international trade, international capital movement, pandemic Coivd -19.

Introduction

Today, there is a fundamental change taking place in the financial markets. What is happening with the digitization of markets, money, and international trade is beginning to challenge the current understanding of monetary and financial systems, as countries move more aggressively toward cashless systems, which loom as a potential technological underpinning.

Digital business models, traditionally associated with expanding access to financial products such as payments, credit and insurance, have attracted the most money and attention, but also experienced the most innovation that has led to new business models in the real economy. Also, private investors, often through the capital markets, have begun to create innovative financing instruments, mostly in sectors such as climate action, clean environment, etc. The electronic international movement of capital also got such a scale, with which the technological industry got a faster development for easier locating of the desired countries. This allowed for a greater volume and speed of transfer of capital, information and the like from one place to another and the aim was to encourage even economic growth.

Therefore, this paper explores the need, role and importance of the digitization of financial markets, which have primarily become more visible in key segments of countries' economies. With the beginning of the pandemic, Internet platforms and electronic networks began to appear that carried out international trading over the Internet. Examples of such well-known networks are Amazon, Ali-express, eBay and other giants of international trade.

The subject of the paper is a presentation of the new characteristics, tendencies and influences of the countries that quickly created a favorable digital business climate on the digital markets. In that direction, the concept of the digital economy presented itself as a way to organize activities aimed at the creation of (goods and services), which people need for consumption with the development and implementation of digital computer technologies. Namely, it made it possible to process a large amount of information and develop the range of services and markets through (providing online services, electronic payments, transfer, transport, etc.).

The purpose of the article is to identify the dynamics of the movement of digitization of financial markets on the economic growth of developing countries in comparison with developed countries, but also to contribute to a greater tendency of growth of their financial platforms.

As a problem, it can be argued that the global digital economy is in a position where opportunities and risks are in balance. This is largely due to the dynamics of the digital economy

in different countries, as well as the systemic nature of the forces driving digital development. Undoubtedly, the leading countries and promising countries benefit from the combination of a high level of digitization and the participation of the authorities in the formation of their digital economy. As a reason for this, it can be determined that many current bodies are equipped with legacy systems and structural complexities and were not well adapted to the upcoming trend of digitization.

The final goal is to gain knowledge that all countries in the world strive for the development of a digital economy and for the digitization of markets because it contributes to GDP growth. It is also believed that the digital economy is the future of not only the economies of individual countries, but also the global economy as a whole.

Conclusion

It can be concluded that innovations in digital finance that underpin the link between digitization and finance offer broad opportunities that the authorities want to nurture. This can reduce costs and barriers, increase efficiency and competition, reduce information asymmetry, and increase access to financial services, especially in low-income countries, but also for underserved populations. Current innovations and technological advances support broad-based economic development and inclusive growth, enable overseas payments and remittances, and simplify and strengthen regulatory compliance and supervision.

It can also be concluded that public policy is the main factor and instrument for the development of the digital economy of the states, as well as the number of participants who use various types of communication.

The purpose of the article is to indicate that digitization significantly affects global financing and that with the changes, many countries have gained great opportunities to participate in the movement of financial flows. Namely, the advent of digital platforms has allowed many foreign managers to invest all over the world, controlling their investments, which was previously impossible. Thus, with the advent of digital programs, the analysis of financial markets is facilitated, which can also reduce the risk of financial flows. With the development of technology, the tendency is to facilitate the implementation of financial activities that will lead to the further development of financial globalization, and thanks to new technologies, new aspects have appeared, for example, global digital currencies.

Summing up, it can be concluded that digitization has a significant impact on financial globalization. But despite the processes of deglobalization, which took place in many countries, as a result of the global pandemic crisis, the involvement of individual countries in the global financial networks gradually increased due to the simplification of operations thanks to modern technologies.

As the most significant conclusions of the latest empirical researches that are mentioned in the paper, they determined that the competitiveness of the countries of the Asian region, in which there is an active development of new technologies, increases. In this region, financial exchanges have developed significantly in recent years.

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An Automated Ranking Model of Higher Education Institutions and Academic Staff in the Republic of North Macedonia

Arbnor Rushiti[1], Artan Luma[2], Ylber Januzaj[3], Azir Aliu[4] and Halil Snopçe[5]

1 SEEU University, Tetovo/Republic of North Macedonia, {ar26730 &a.luma&azir.aliu&h.snopce}@seeu.edu.mk
2 University "HaxhiZeka", Peja/Kosovo, ylber.januzaj@unhz.eu

Abstract: The implementation of Open Data in education, especially in the higher education cycle is a problem that has started to be addressed and more work is also required in this regard. Having a new and efficient

automated model for integrating accumulation, interpretation, and exploitation of open data in university education can be useful to improve the universities in order to better rank and review the research papers, which is very useful in open data education. The main purpose of this research is to rank the publications of university professors on an open data platform.The idea is to make an automated model for integrating accumulation, interpretation, and exploitation of open data in university education in order to rank the published scientific works by applying Data Mining techniques. In order to achieve the required, it is necessary to conduct research that will define the weaknesses and strengths of using Open Data Research Ranking Platform, at the University, as well as the need to apply our proposed model called Research Ranking Platform.

Keywords*—Open data, Open Education, Big Data, Machine Learning, Data Mining, Higher Education*

Introduction

Currently there is a very large amount of data in the field of education. But these data, if not converted into useful information, remain as unnecessary data. It is imperative that these data be converted and extracted from the information they can use. It is not necessary to do only extract of these data, but we need also to do data cleaning, data integration, data transformation, data mining, and data presentation.
A new trend has already emerged open data which can play key roles in bringing digital innovation to education by engaging students, professors and researchers in data collection activities and allowing them to understand the concept of data through analysis and interpretation in relation to the real world. Referring to earlier research and the published scientific work entitled Open Data in Education as Literature Review, we have noticed the need for such a platform in the Republic of North Macedonia, which serves to rank publications of university professors.

Purpose of Study

The purpose of research in this doctoral thesis is the application of open data in order to improve the universities in order to better rank and review the research papers.The idea is to make an automated model for integrating accumulation, interpretation, and exploitation of open data in university education in order to rank the published scientific works by applying Data Mining techniques.In order to achieve the required, it is necessary to conduct research that will define the weaknesses and strengths of using Open Data Research Ranking Platform, at the University, as well as the need to apply Research Ranking Platform.

Research Methods

Starting from the basic function of this research, which consists in finding a concrete answer to the question what are the key assumptions and what is the function of Open Data in modernizing and digitalization the Universities, it is clear that this is an application of action research. The results of this research will be used to take appropriate measures and activities that will lead to faster achievement of performance improvement at universities, and beyond in other organizations that would benefit from the implementation of this platform.

The research will follow the qualitative research paradigm which is an in-depth penetration into the nature of the problem of the phenomenon under investigation, to a limited number of respondents (universities) with quantification of some of the obtained results whose frequency is significant. The research will be reduced to the interpretation of the findings and offering a solution.

Findings and Results

Having a new and efficient automated model for integrating accumulation, interpretation, and

exploitation of open data in university education can be useful to improve the universities in order to better rank and review the research papers, which is very useful in open data education.

From this research I expect to obtain results that would be useful in the development of universities, i.e.: To make a comparison between universities as to who has the most publications, in which area the University has published several scientific papers, comparison of publications between universities for a specific area etc.

The reports that will be generated by our proposed model will be accessible to third parties who have an interest in the results generated such as: universities, Agency for Quality in Higher Education, Ministry of Education and Science of Republic of North Macedonia, Project application offices, Government etc..

Conclusions and Recommendations

This study introduces an automated model for integrating accumulation, interpretation, and exploitation of open data in university education.

This study aims to lay the basic foundations of the use of open data in universities, based on the factual situation of the implementation of open data in the country and referring to the literature research on the various ideas and forms of how they have implemented those in universities across different countries.

Also, this study aims to find and propose a suitable algorithm for the integration, accumulation, interpretation and use of open data of university education in order to use the results from third parties of interest.

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THE CONNECTION BETWEEN INDUSTRIAL DESIGN AND ADMINISTRATIVE FACILITIES

Assoc. Prof. Vaska Sandeva, Assoc. Prof. Katerina Despot, Vladica Nikolovska

University "Goce Delchev" - Stip, R. Macedonia

Abstract:

Industrial design serves to satisfy the need for beauty and utility. According to its essence and form, with which it is presented to the public, it is halfway between invention and pure artistry.Industrial design is a design process applied to products to be produced through mass production techniques. Its key characteristic is that design is separated from production.The design for office buildings, as well as their interior decoration, changes over time through various influential trends in society.It depends on the social occasions, culture, but also on the willingness and talent of the architects to find the most efficient office layout in accordance with the current trend regarding the interior style and the organizational culture that prevails in a certain company.

The functional nature of the industrially produced objects, that is, the industrial design, is the key link between the space and the users of the administrative facilities.Industrial design has a functional and aesthetic impact, thereby achieving a whole in administrative facilities that affects the psychology and efficiency of use by users.

Keywords: Man, spaceand industrial design

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Keywords: Man, spaceand industrial design

Identification and Construction of Some Special Classes of Self-Complementary Graphs

Bilall I. SHAINI[1*],Shpëtim REXHEPI[2]

[1*]*Department of Mathematics, Faculty of Applied Sciences, University of Tetova, NMK*

[2]*Department of Mathematics, Mother Teresa University, Skopje, NMK*

[*]*Corresponding author e-mail: bilall.shaini@unite.edu.mk*

Abstract: A self-complementary graph is a simple graph that is isomorphic to its complement. Thus, a graph G is self-complementary if there is an isomorphism from G to G^c. Due to the special structure of these graphs, they are rare in number compared to arbitrary simple graphs with the same number of vertices.The main goal of the paper is to identify self-complementary graphs through the definition and analysis of their basic properties, especially the existence of an isomorphism between two such graphs. However, the paper also contains results related to the construction of self-complementary graphs, and

some of their more complex properties are listed.

Furthermore, the emphasis in this paper is also the construction of some special classes of self-complementary graphs, especially those with 8 vertices,with the fact that the text is accompanied by figures in order to better observe of their properties.

More on properties of distance and connectivity in self-complementary graphs contains many statements that show well the specific structure of self-complementary graphs, and most of them have been proven.

The last part of the paper contains a smaller number of assertions about the chromatic number, planarity, and cycles (with an emphasis on 3-cycles) and paths in self-complementary graphs.

Keywords:*Self-complementary graphs;isomorphism; graph construction;sequence of degrees*

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PERCEPTION AND INFLUENCE OF TRAFFIC SIGNS ON TRAFFIC FLOW

Authors: Nikola Simeonovski, Olivera Petrovska, Andon Petrovski, and Darko Spasenovski

1.Nikola Simeonovski, student at University Mother Teresa, Faculty of Technical Science nikolasim22@gmail.com
2.Olivera Petrovska, University Mother Teresa Skopje, oliver.petrovska@unt.edu.mk
2.Andon Petrovski, 24ING dooel Bitola, 24ingbt@gmail.com
3.Darko Spasenovski, 24ING dooel Bitola, 24ingbt@gmail.com

Abstract: Traffic signalisation is consisted of system of means, devices and signs that play an important role in regulating traffic safety. Traffic participants are obliged to act in accordance with the traffic signals placed on the road even when they deviate from the regulations on traffic rules.

The messages of Traffic sign's affect driver's behavior, so they should have clear and unambiguous content. Any deviation from the regulations and standards for traffic signaling, the participants in the traffic are put into situation of incorrect message reception and inappropriate further traffic behavior. Such deviations from the standards can have serious consequences for the traffic system.

The increased degree of motorization is a requirement for the application of complex and modern strategies for traffic flow regulating, as well as techniques that will satisfy the traffic system and will improve the quality of service. Effective and safe regulation of traffic is possible by applying modern techniques and methods for regulating traffic, which largely depend on the quality of traffic signals.

From the aspect of traffic safety, the reception and perception of the message, the traffic signalization is important for the management of the traffic and is of special importance for the traffic safety.

In this paper through practical examples are shown the influences of the traffic signals and the retroreflection of the perception and the recieving of the messages which are of great importance for the road safety.

Keywords—*Vertical signalization, Horizontal signalization Retro-reflections, Perception.*

Daniela Stanojkovska, PhD, Institute for Social Activities – Skopje

Daniel Pavlovski, PhD, Mother Teresa University

The professionalisation ofSocial Work: Comparative study

This article is based on detailed descriptions of the professional features of the social work in North Macedonia, Serbia and Croatia. Social work in these countries is discussed in terms of three features: licensing, professional development and supervision, all aimed to improve the quality of the services. As a cross-national study, the goal of this study is to present comparative material that explores the range of the similarities and differences in these countries.

Keywords: professionalisation, licensing, professional development and supervision.

Application of Markov chains in epidemiology

Authors: Natasha Stojkovikj[1], Limonka Koceva Lazarova[2], Maja Kukuseva Paneva[3], and Aleksandra Stojanova Ilievska[4]

1 Faculty of Computer Science, GoceDelcev, University, North Macedonia,(natasa.stojkovik@ugd.edu.mk)

2 Faculty of Computer Science, GoceDelcev, University, North Macedonia,(limonka.lazarova@ugd.edu.mk)
3 Faculty of Electrical Engineering,GoceDelcev, University, North Macedonia,(maja.kukuseva@ugd.edu.mk)
4 Faculty of Computer Science, GoceDelcev, University, North Macedonia,(aleksandra.stojanova@ugd.edu.mk)

Abstract: Mathematical modeling is a powerful tool for description of many processes in nature and society. Different mathematical models can be used for analysis and prediction of the epidemic diseases spread. Epidemic disease transmission outbreaks are modeled along with Markov chain in order to monitor and control epidemic spread. In this paper SIS (Susceptible- Infections- Susceptible) and SIR (Susceptive- Infectious- Recovered) models with discrete Markov chain are represented. These models are developed to see how the number of infected individuals changes over the time.

Keywords*—epidemiology, mathematic method, Markov chain*

Introduction

Epidemiology studies the cause, spread and control of infectious disease. Mathematical models are used to understand disease outbreaks, predict future occurrence of events and theirinfluenceonthe population. These predictions help to understand how fast an infection canspread and to give directions for the measures which should be taken.

The Susceptible- Infected- Susceptible (SIS) model describes the transmission of disease when

recovered individual from the population do not have permanent immunity and immediately may become infectious again. The results for stochastic SIS model in [1] show normal distribution nature of the quasi-stationary distribution when the population size is large, and the reproduction number is greater than 1. In [2] transmission parameter is function of the population size.

The SIR model divides the population into three subgroups: susceptible, infected and removed/recovered (dead, immunity) individuals. In this model a susceptible individual gets infected with disease and recovers from it and haspermanent immunity. The main aim of this model is to predict the trajectory of epidemic transmissionbecause transitions are made from one to another population. This model was developed in [3]. More complex SIR models are obtained from [3] by taking into consideration more assumptions and parameters [5,6].
Also, we will consider the epidemiological models of binomials chains. These models were first developed in 1920 and 1930 by Reed, Frost and Greenwood, so according to them the models are named. With these models, can be estimated, the duration and size of the epidemic.[4]

Purpose of Study

In this paper a review of a discrete model of Markov chain for describing epidemic spread is presented. The aim of this review is to explain the formulation of SIR and SIS epidemic models for the spread of infectious disease and to estimate transmission and recovery rates.

Research Methods

The research will be conducted using a discrete Markov chain.

Findings and Results

This paper presents an overview of some mathematical models which can be used in epidemiology. SI, SIS, SIR, Greenwood and Reed-Frost model will be considered.

Conclusions and Recommendations

SI, SIS, and SIR models are the simplest mathematical models that can be used for analysis of spreading infectious diseases. Markov chains are important tools for mathematical modeling of epidemiological processes. They enable transparency and accuracy regarding the epidemiological results. The mathematical models which are based on Markov chains, can be used for prediction of spreading of infectious diseases and for prediction on outcomes of taking measures for stopping the spread of infections. Of the other site, binomial epidemics models as Greenwood model and Reed-Frost model can be used for estimate duration and size of the epidemic.In the future, the authors will consider more complex mathematical models (like SEIR, SEIR+D) for prediction of epidemiological process in our researches.

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Extended Abstract

Improving energy monitoring for personal use with AI powered energy disaggregation and predictions, Macedonian pilot study and overview

Authors: Pavel Taskov[1], LG Sandjakoska[2]
1 University for Information Science and Technology 'St. Paul the Apostole' Ohrid, North Macedonia pavel.taskov@uist.edu.mk
2 University for Information Science and Technology 'St. Paul the Apostole' Ohrid, North Macedonia ljubinka.gjergjeska@uist.edu.mk

Abstract: In an increasingly interconnected world, and one with rising electricity costs and the growing concerns of climate change, there has been increasing need for better control of household energy use. We propose a system of reusing old hardware from smartphones to extract granular data by optically reading the output of household energy meters. Next, we propose an app with the human in the loop to train a data visualization and usage prediction system; that can help predict the significant energy expenditures in a house, and give tips and notifications, while staying private and local.

Keywords*—energy disaggregation; nonintrusive load monitoring (NILM); machine learning;appliance identification, data privacy, power usage*

Evaluation model for the Qualification standard: Teacher in higher education, related to both academic title and scientific field of the teacher

Authors: Riste Timovski[1], Tatjana A. Pachemska[2] and Dean Iliev[3],

1 Faculty of computer science, Goce Delcev University in Stip, Republic of North Macedonia,(riste.timovski@ugd.edu.mk)

2 Faculty of computer science, Goce Delcev University in Stip, Republic of North Macedonia,(tatjana.pacemska@ugd.edu.mk)
3 Faculty of pedagogy, University St. KlimentOhridski, Republic of North Macedonia,(dean.iliev@uklo.edu.mk)

Abstract: Research for what qualifies faculty to teach an undergraduate, graduate and PhD levels across the world shows that the profession: teacher in higher education is probably one of the least regulated professions in terms of the skillset required for a person to be able to teach. In our country, having a doctoral degree in a relevant field and the teaching / research experience are the only relevant characteristics a teacher must possess in order to be able to progress in his/her academic career. But, questions arise about all the other important skills and competences a teacher must possess, especially from the pedagogical perspective in

general. Related to this, new standard for the qualification: Teacher in higher education is proposed. It refers primarily to gaining knowledges, skills and competences related to the teaching in higher education institutions, from formal, informal and non-formal point of view and all of them – improving the teacher. A research was conducted showing the current condition in terms of learning outcomes defined within the standardand related to both the academic level and the scientific field of the teachers. With processing these data into a qualitative assessment tool based on a mathematical modeling, we obtain a clear picture for the learning outcomes with highest need to be improved. The activities conducted within the research were a solid base for creation of a module towards life long learning program: professionalization of the profession: Teacher in higher education (didactical aspect).

Keywords—*Teacher, Higher education, Mathematical modeling, AHP, DEA*

Introduction

Several factors define the framework of skills and competences a teacher should possess in order to increase his/her level of quality in general: needs of the individual and/or society, needs of the labor market and persistent continuation of the education process: formal, non-formal and/or informal. They all converge into a single person being teacher and reflecting multiple key job tasks that can be standardized with appropriate competences' areas and learning outcomes (for each), defining the qualification standard: Teacher in higher education. It proposes 10 main different key job tasks that can be evaluated related to a specific category of a teacher: Has knowledge in the scientific field;Realizes scientific and professional research and their application in the teaching process;Realizes and supports teaching, learning and studying;Values students;Mentors students;Applies new technologies in teaching, learning and studying;Communicates and cooperates with all participants in the teaching process;Permanently and life-long improves professionally and collaboratively;Acts entrepreneurial, andPractices and creates media and critical literacy.

In this research, two main categories of teachers are evaluated: academic title, and scientific field.

Purpose of Study

The main purpose of the research is:

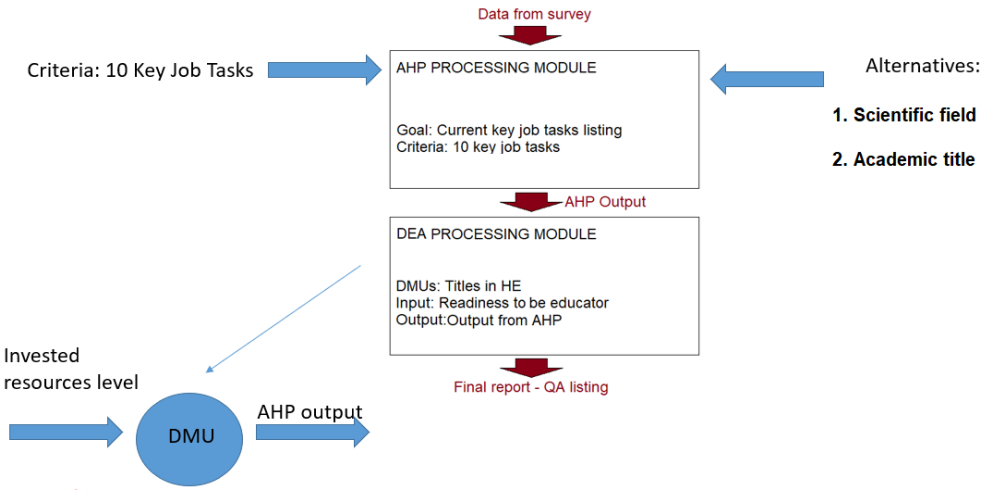
- To evaluate the current condition with the 10 key job tasks, related to the 2 categories of teachers in Republic of North Macedonia;
- To point out representatives from each category that have lower levels of qualitative evaluation related to the qualification standards' elements, and
- To propose measures for improvement, towards increase of the quality of the teachers.

Research Methods

Data was collected via specific surveys targeting representative sample of all kinds of teachers in higher education related both to the scientific field and academic title. For evaluation of the current qualitative level of possession of each of the qualification standard's elements (key job tasks), the need of improvement regarding each of the element, as well as the level of readiness of the teacher to educate colleagues towards some elements of the standard, levels from 1 (lowest level) to 4 (highest level) were used. These 3 different groups of questions determined the different inputs and outputs in both AHP and DEA techniques in the later processing. The collected data was processed through a evaluation system based on a mathematical modeling techniques: Analytic Hierarchy Process (AHP)

and Data Envelopment Analysis (DEA). AHPenables objectively to find the most possessed key job task among the teachers (with best evaluation levels), with the importance of the criteria included and bias excluded. Afterwards, DEA enables generation of final QA report with information about relatively efficient and inefficient representatives of the teachers, both related to the academic title and the scientific field, depending on the level of presence of the key job task as output parameter, and related to the resources invested in obtaining those qualifications' elements, as input parameters. The evaluation model is shown on figure 1.

Figure 1. Evaluation model



Findings and Results

The results point out the current status related to the possession of the key job tasks defined within the standard and from the teachers belonging to different academic title and/or different scientific field:

Table 1. Final evaluation result (part of the data is still being processed)

Academic title	**Result (Academic title)**	**Scientific field**	**Result (Scientific field**
SeniorLecturer	1	Biotechnical sciences	n-bts
Lecturer	n-l	Medical sciences and health	n-msh
SeniorLector	n-sl	Social sciences	n-ss
AssociateProfessor	0,951581	Natural sciences and mathematics	n-nsm
FullProfessor	0,930628	Technical technological sciences	n-tts
AssistantProfessor	0,92737	Humanities	n-h
Professor of HSV	0,924684		

AssisstantDoctoralStudent	0,904968		

The categories evaluated with level 1 are relatively efficient. Other categories are relatively inefficient and improvement measures are needed towards better qualitative performances.

Conclusions and Recommendations

The proposed model is designed in accordance to the Qualification standard: Teacher in higher education in Republic of North Macedonia. It gives an objective qualitative information related to the current possession of the qualifications' elements regarding both the scientific field and the academic title of the teachers in higher education institutions. It is a must to conduct more massive survey towards collecting data from bigger sample of teachers and having more realistic data. The evaluation model finds the weak skills and competencies and proposes their improvement by a correct percentage, through a life-long learning process.

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"ECO FEATURES" RECOGNIZED AS SUSTAINABLE URBAN STRATEGIES APPLICABLE IN THE NEGLECTED AREA IN THE CITY OF SKOPJE

Radmila Tomovska PhD[6]; Iva Petrunova PhD[7]; Hekuran Musli[8];

Faculty of Architecture and Civil engineering at University Mother Teresa – Skopje, N.RM; NGO GRADOT UBAV Skopje, NRM

[6] Faculty of Architecture and Civil engineering at University Mother Teresa – Skopje, N.RM
[7] NGO GRADOT UBAV Skopje, NRM
[8] Faculty of Architecture and Civil engineering at University Mother Teresa – Skopje, N.RM

Abstract:

This research analyses certain sustainable urban strategies that are in correlation with the improvement of the living conditions of the local flora and fauna, improvement of the air quality, air temperatures in summer period and improvement of the physical wellbeing and social cohesion of it's habitants. More precisely, this research discusses the possible ways of application of the analyzed ecological and bioclimatic urban strategies for achieving sustainable solutions regarding urban planning and design of a green active public space on a selected neglected location in the Novo Lisice Municipality in Skopje. The proposal for new active green public space is designed to be context-sensitive and ecologically treated space. It is intended this project to be a new meeting point for sport and recreation for the local residents, that in the same time will offer green and safe home for all the local flora and fauna species.

This study was conducted in the following steps. At first, the ecological and bioclimatic discourse was analyzed in order to give explanation which of the mentioned principles can be applied on the analyzed case. Then, different analytical methods and information from various scientific areas were used, which helped in detecting the real problems present on the analyzed location. The following step was to define the target group of future visitors and residents on the newly defined conceptual design. In order to define the adequate sustainable strategies that will have ecological, health and socio-environmental qualities, the so called "eco features" were established. "Eco feature" in this research represents a sustainable quality of a particular strategy or urban measure that can improve the coexistence of all the local inhabitants on this location and neighborhood: people, animals, insects and plants. In the same time the selected strategies will improve the air quality, lower the summer temperatures, revitalize the chosen location, improve the physical wellbeing and social cohesion, create people centered urban design and redefine the city values.

Key words: *Sustainable urban strategies, Local flora and fauna, Physical wellbeing, Social cohesion, Environmental urban planning.*

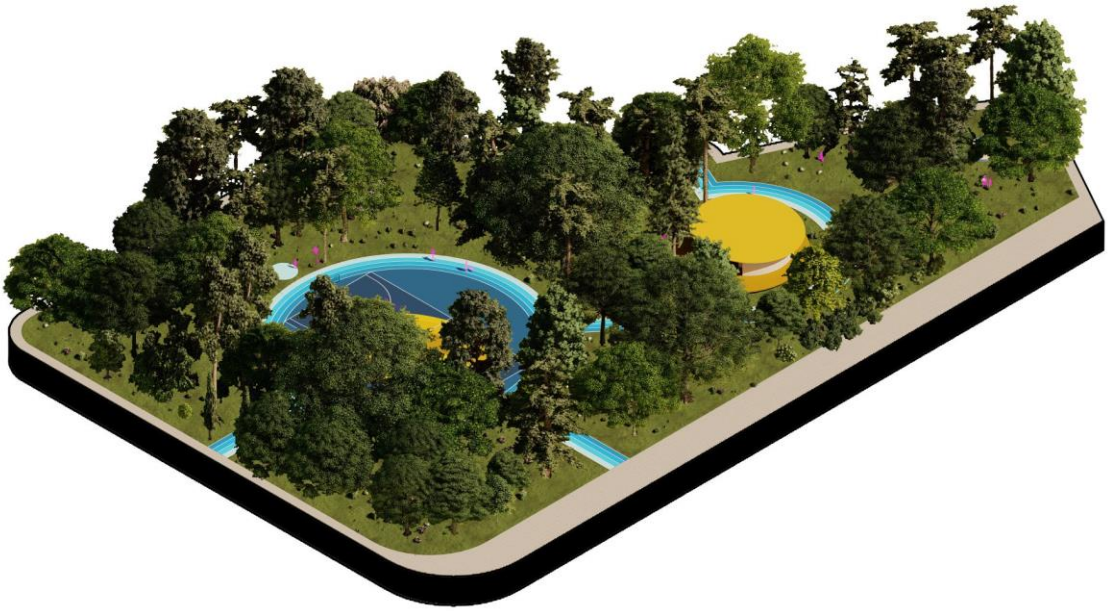

Figure 1. Design solution for improvement of the coexistence of all the local inhabitants in this location and neighborhood: people, animals, insects and plants, Source: Authors.

Optimization of Cloud Costs

Aleksandar Velinov[1],Zoran Zdravev[2], Aleksandra Nikolova[3]

1 University Goce Delchev,Macedonia,aleksandar.velinov@ugd.edu.mk

2 University Goce Delchev,Macedonia,zoran.zdravev@ugd.edu.mk

3University Goce Delchev,Macedonia,aleksandra.nikolova@ugd.edu.mk

ExtendedAbstract

Abstract: A large number of companies and organizations nowadays are making the decision to migrate their applications to the cloud. The resources needed to host their applications are provided by a cloud provider.It determines the price for the resources according to certain criteria. The users of the services pay the price depending on the resources they use.After the migration of the applications to the cloud, the consumers of cloud resources should try to optimize their costs.This paper presents several methods that we can use for optimization of cloud costs.In addition, it is provided a real case study of application of these methods in practice. According to the obtained results, cloud costs are reduced by about 60%.

Keywords*—cloud,costs, costs optimization,cloud computing*

Introduction

Cloud technologies are increasingly used nowadays. A large number of organizations and enterprises are planning or have already migrated their systems to the cloud. A migration of Moodle LMS of Goce Delchev University to the cloud is presented in [1]. Spotify, one of the leading media service provider in 2016 migrated everything from on-premises to the cloud [2]. In the same year, Netflix, one of the most famous streaming services, announced its cloud migration[3]. Capital One, a top ten bank in the U.S financial services industry, in 2020 reported their full migration from the on-premises data centers to the cloud including all applications and data [4]. There are a lot of other case studies for transition from own data centers to the cloud [5] [6].

Cloud technologies have a lot of advantages. Some of them are: scalability, flexibility, cost savings, work from anywhere, automatic updates, security, disaster recovery and so on [1] [7]. One of the listed benefits is cost savings. This is one of the first questions that all those who want to make a cloud migration ask themselves. Although this is certainly important, it is not the subject of this research. The purpose of this research is how to reduce costs after the migration to the cloud. This is very important for organizations and corporations in order to save as much money as possible. To achieve this, they must optimize the resources they use.

There are several studies that address this topic, but not all of them cover all the methods that can be used for optimization of cloud costs.Weintraub and Cohen in [8] present a model that is used for finding optimal combination of service providers to minimize the cloud costs. They propose three strategies for implementation of the model in organizations. Chaisiri et al. in [9] proposed an optimal cloud resource provisioning algorithm for allocation of resources that are offered by multiple cloud providers.Qi et al. in [10] present a novel cloud service cost optimization method considering multiple impact factors. Netjinda et al. in [11] proposed a new framework for cost optimization where the number of purchased instances, instance type, purchasing options and task scheduling are considered in the optimization process.Osypanka&Nawrocki in [12] present a novel approach for cloud costs optimization using machine learning. They also provided an experimental evaluation of their solution. Couthino et al. in [13] proposed a solution for optimization of cloud resource management in order to reduce payment costs and the execution time of user applications. Kokkinos et al. in [14] present an algorithm for cost and utilization optimization of Amazon EC2 instances. Deniziak et al. in [15] proposed a methodology for cost optimization of cloud real-time applications, which are conformable to the Infrastructure as a Service (IaaS) cloud computing model.

Purpose ofStudy

The main purpose of this paper is to show methods for reducingthe costs for resources that we use in the cloud. These resources are provided by cloud providers. For all resources cloud providers have established a price. It may vary depending on the cloud providers and the calculation method. What is important for us as users is to provide resources that will be sufficient to run our applications and have lower costs.This research is about costs optimization of resources that implement the IaaS model of cloud computing.

ResearchMethods

After making the decision to migrate applications to the cloud, it is in our interest to monitor the costs we have for the allocated resources. What if the costs are high? How should we react in this case so that we can fit into our budget? For this purpose, there are several methods that can be used to optimize the cloud costs:

- Identification of unused or idle resources
- Right-sizing of resources
- Using appropriate reserved instances and savings plans
- Using Spot instances
- Reduction of data transfer costs
- Using cloud native design

Findings and Results

In 2021, at University Goce Delchev- Shtip, we made a complete migration of our applications from on-premises to the cloud. As a cloud provider we used the Microsoft Azure platform. During our cloud experience, we tracked the costs we incurred for the resources over a 1-year period (October 2021 – October 2022). In the first three months, the costs were slightly higher than expected. That is the reason why we decided to apply methods for optimization of cloud costs:

- *Identification of unused or idle resources* – Before migrating our applications to the cloud, we created multiple test instances. We used these resources to test the behavior of our applications before they were released into production. To reduce the costs, we deleted these test instances.
- *Right-sizing of resources*–For applications that are not used frequently, we performed appropriate adjustments to the performance of the instances.We changed the type of the instances with lower performance in order to optimize the costs.
- *Using appropriate reserved instances and savings plans*–According to our research, after the third month of the migration, we decided to perform a 1-year reservation for our instances.
- *Using Spot instances*–We have not used spot instances yet, but in the future we plan to use them as test instances in order to reduce our costs if we create new instances that are not reserved.
- *Reduction of data transfer costs*–Data transfer primarily depends on the application that we used. We did not identify any unnecessary data transfers and that is the reason why we did not apply this method to reduce cloud costs.
- *Using cloud native design*–For one of our most demanding applications, we initially used Virtual Machine Scale Set (VMSS) and load balancer for autoscaling. Regarding the given scaling rules, we determined that we did not have inclusion of additional instances. This is the reason why we

continued to use regular virtual machine. If you have a large number of users and requests, it is recommended to use auto scaling instances with appropriate rules.

With application of the methods for costs optimization, we observed a reduction in costs by about 60%.

ConclusionsandRecommendations

Optimization of cloud costs is very important for users and organizations who have migrated their applications to the cloud. The savings that will be provided can be used for allocation of new resources or other investments. In this paper we present several methods that can be used for cloud costs optimization. We will focus our future research on determining costs across multiple cloud providers.

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Extended Abstract

A corpus-based functional analysis of the usage of Macedonian marker *pa* by high officials in statements during COVID-19

Edona Vinca[1], Rilind Mahmudi[2], and Majlinda Ismaili Mahmudi[3]

1 Mother Teresa University in Skopje, North Macedonia, (edona.vinca@unt.edu.mk)

2 Mother Teresa University in Skopje, North Macedonia (rilind.mahmudi@unt.edu.mk)

3 Mother Teresa University in Skopje, North Macedonia
(majlinda.ismaili.mahmudi@unt.edu.mk)

Abstract:

The idea that language does not solely serve to exchange information was introduced by Malinowski (1923, 1935) and was later developed by Jakobson (1960), as well as by Halliday(1994). The elements referred to as *markers* in this paper are called *phatic expressions* by Halliday, representing socio-pragmatic elements typically expressed in situational instances that call for social cues. We analyze such elements within the framework of Speech Act Theory and Politeness Theory seeking to gain deeper understanding in the role and functions such elements have in constructing interpersonal relations. The element at hand is the Macedonian marker *pa* observed in spoken statements given during the COVID-19 pandemics by high officials.

Keywords—*pragmatic marker, pragmatics, discourse, speech act, politeness*

Introduction

The idea that language serves a social purpose is widely supported in contemporary linguistics. During times of hardship such as the COVID-19 global pandemic, new forms of interactions

emerge and assist the construction of interpersonal relations within the new reality. This paper examines the spoken statements given by high officials in Macedonian language during the pandemic, focusing specifically in the interpersonal functions of the marker *pa* 'well'.

Purpose of Study

Our study strives to determine the interpersonal functions of the discourse marker *pa* in speech acts used in implementing politeness strategies. The study aims at filling the existing gap in corpus-based analysis of such kind for the Macedonian language – a language which remains under-represented in the spoken-discourse and critical analysis.

Research Methods

This study is planned as a corpus-based empirical analysis of authentic spoken statements of high officials during the COVID-19 pandemic in Macedonian language. The sample is comprised manually due to lack of corpora for the language at hand. It is composed of 5 000 tokens analyzed through a corpus-analyses software (AntConc). The annotation shall be performed through the software and further analysis through Excel.

Findings and Results

This study is expected to find correlations between the ideational and interpersonal functions of language by analyzing the usage of the marker *pa* in Macedonian language during the COVID-19 pandemic. The analysis will be performed within the framework of the Speech-Act Theory and Politeness Theory to examine the usage of the marker in face-saving speech acts as well as in the realization of positive and negative politeness strategies.

Conclusions and Recommendations

This paper strives to fill the gaps in the study of spoken Macedonian discourse by examining the usage of the marker *pa* in official statements of high officials during the COVID-19 pandemic. It also represents a decent opportunity to take a closer look at how language was used in a social context that had not been experienced before, seeking to prove that social contexts incite language change in constructing interpersonal relations.

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The Process of Post-legislative Scrutiny in the Assembly of the Republic of North Macedonia

Author: Fadil Zendeli

SEEU, North Macedonia, fadil.zendeli@gmail.com

Abstract: Post-legislative scrutiny in the Assembly of the Republic of North Macedonia is a parliamentary instrument of supervision which is little known in our country but quite developed in some western democracies. Through the post-legislative process, the efficiency and quality of the legislative contents can be increased and with this the efficiency of the work of the law-enforcement bodies can be increased, but above all effective legislation that will protect the rights of citizens and society in general. Strengthening the post-legislative process will increase the weight of the assembly not only as a creator of legislation but also as its evaluator.

Currently, there is no post-legislative scrutiny in the republican assembly, except for a certain project from the international organization.

The scrutiny of the legislation is carried out by the bodies of the executive power and this creates the perception of imbalance in the division of powers and the dominant position of the executive power over the legislative power. The paper will also compare the post-legislative experiences of advanced western democracies.

Keywords—*legislation, evaluation, effectiveness, scrutiny, democracy,*

Introduction

The topic is important to address because it strengthens the role of the assembly in the process of evaluating legislation, but at the same time increases the independence and efficiency of the assembly as well as the quality of legal texts. Post-legislative scrutiny makes the executive more accountable and ensures that the expected changes are implemented. This paper will be of great value in contribution to aligning the country's legislation with the best standards of western democracies.

Purpose of Study

The research study should highlight the shortcomings of the existing system and the benefits from the installation of the parliamentary instruments of scrutiny over the approved legislation.

Research Methods

Research methods will be applied that will answer the research problem, should the republican assembly need to strengthen its scrutiny position over the legislation already approved and how can I achieve this.

Findings and Results

The results found will be argued and supported with scientific methodology that will verify or deny the hypothesis presented.

Conclusions and Recommendations

Conclusions and Recommendations will be drawn as a result of research and analysis of the topic and will serve for further research in the field of parliamentarism.

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Analyses of Brain Drain, Causes, Losses And Opportunities

Izet Zeqiri[1], Bekim Fetaji[2]
1 Mother Teresa University, North Macedonia, (izet.zeqiri@unt.edu.mk)
2Mother Teresa University, North Macedonia, (bekim.fetaji@unt.edu.mk)

Abstract: The research study focuses on investigation of the brain drain, concept of Causes, Losses And Opportunities, focusing on the strategy how to reverse the brain drain. The main objective is to provide a analyses and strategy for the Western Balkan governments to reverse this brain drain and encourage the sustainable return and placement of skilled emigrants in developing sectors such as IT, digitalization, robotics, digital design, etc.

The Western Balkan governments have to reverse this brain drain by following the example of Croatia. In December 2021, Croatia introduced a mechanism to reverse its brain drain by promising Croatian expatriates in the European Union up to 26,000 euros ($29,000) to return and start a business. A systematic review is based on background research of published research. The comparison of the two revealed that he turing reduction is more general than mapping reduction. Insights and discussion of the results are discussed and provided.

Keywords—*Brain Drain, Causes, Losses And Opportunities, strategy for reverse brain drain*

1. Introduction

One important feature of our everyday life is the increased mobility of the humanpopulation. As never before, individuals move between cities, countries, regions andcontinents. Migrants make ever-growing shares of the population worldwide. Migrationhas become one of the most important political issues and managing migration one ofthe most challenging policy areas, spread across several fields, ranging from economicsustainability to national security. Migration policy is one of the most important aspectsof European integration as well as the process of European enlargement.People have migrated throughout history in search of basic resources and better living conditions.

According to Friedrich Ebert Stiftung Youth Studies, in 2018, one third of young people from the Western Balkans expressed a "strong" or a "very strong" desire to emigrate from their countries, ranging from 26% in Montenegro, 27% in Bosnia, 30% in Serbia, 34% in Kosovo, 35% in North Macedonia, and 43% in Albania. These figures are even higher in some other studies.According to preliminary findings in the census process, compared to twenty years ago, the country's population decreased by at least 10% and approximately 6-700,000 Macedonians moved abroad.

As in many post-communist countries, the flow of the highly skilled has likewise beenidentified as one of the major obstacles for North Macedonia's socio-economic development. North Macedonian policy makers have not yet managed to design and implement relevant andevidence based policies that could mitigate the effects of the brain drain by stimulatingreturn migration of the highly skilled and possibly attracting foreign highly skilled workersthat could contribute to the development of the research industry, science and theeconomy in general.

"Brain drain" is often said to be a pejorative term, standing for the large-scaleemigration of highly skilled and highly educated individuals who have obtained advancededucation at a post-graduate level and work in the tertiary sector - scientists, engineersand researchers. They are often motivated to leave their countries by various factorsof rejection called push factors; additional reasons for leaving are attractive or pullfactors, such as a promising situation in a remote destination.

2. Analyses of the Migration in Macedonia

World Bank recently announced that 626,312 people emigrated from Macedonia at the end of 2013. Below are some data from World bank.

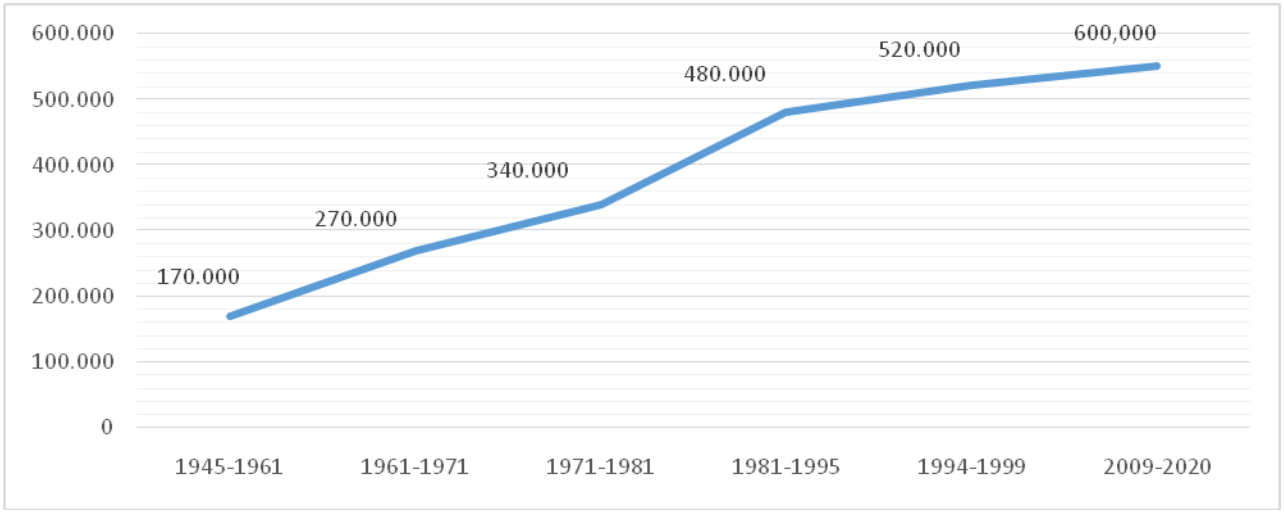


Figure 1. World bank analyses;Source: The Global Economy.com

BRAIN DRAIN INDEX OVERVIEW, 0 (LOW) - 10 (HIGH) TOP 20 COUNTRIES IN EUROPE

The average for 2021 based on 41 countries was 3.65 index points. The highest value is in Albania: 8.3 index points, and the lowest value is in Sweden: 0.7 index points.

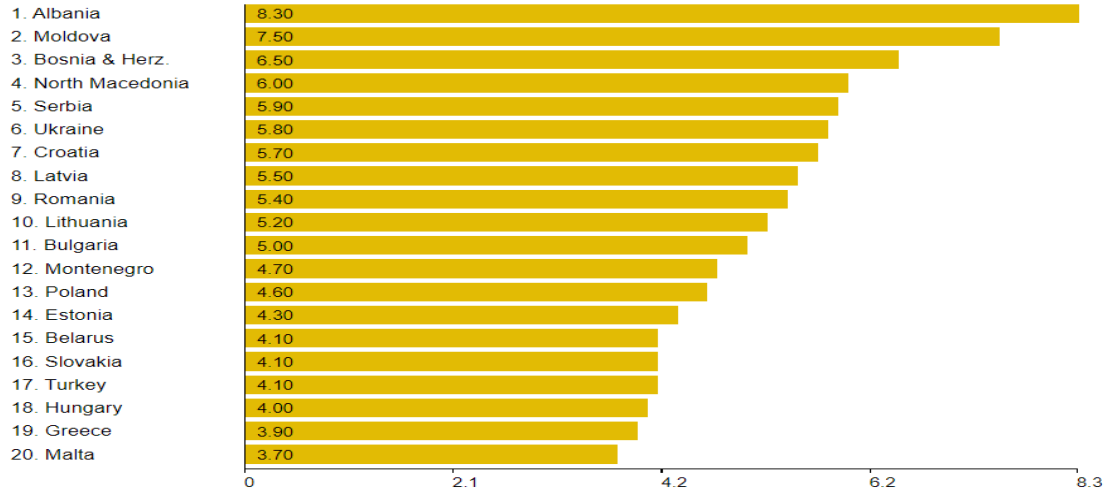


Figure 2. The average for 2021;Source: The Global Economy.com

The average value for North Macedonia was 6.01 index points with a minimum of 4.9 index points in 2018 and a maximum of 7 index points in 2007. The latest value from 2021 is 6 index points. For comparison, the secular average in 2021 based on 173 countries is 5.25 index points.

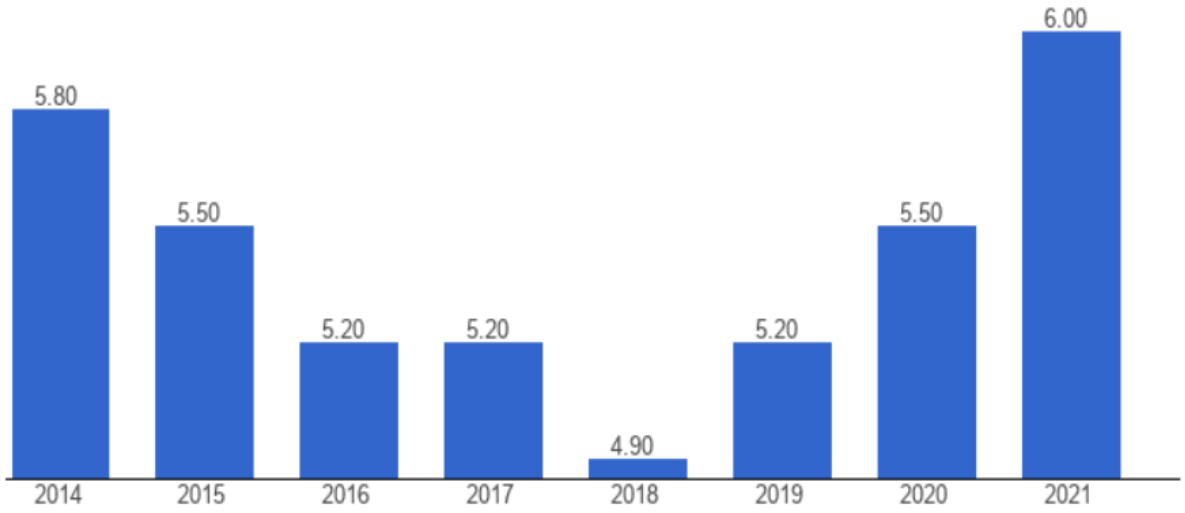


Figure 3. average value for North Macedonia,Source: The Global Economy.com

Most important reasons for "running away" from macedonia abroad are:

Unemployment, - 19.4% Unemployment, and close to 30% of youth Unemployed. They have been working for 4 years and more.

The rate of poor people from the total population is 21.8%. Almost 45,000 citizens lived on the threshold of poverty.

Unstable political situation - political crisis

Unfavorable conditions for personal development. I have the opportunity for education, training and development in work and career.

Severna Macedonia is in 87th place with 39 index points in the fight against corruption

3. Analyses of the Length of Unemployment

The length of unemployment causes migration

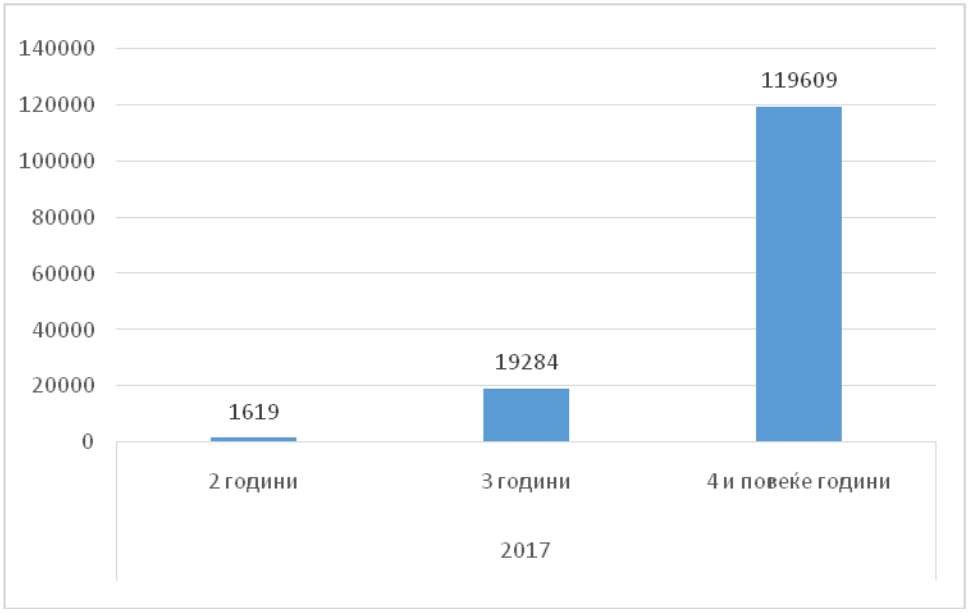


Figure 4. average value of migration 2017

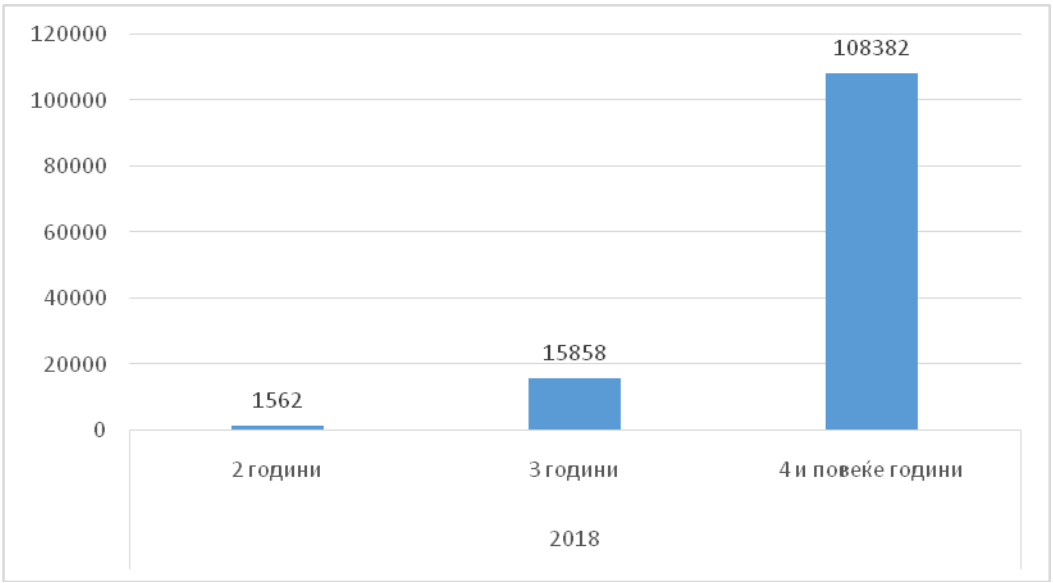
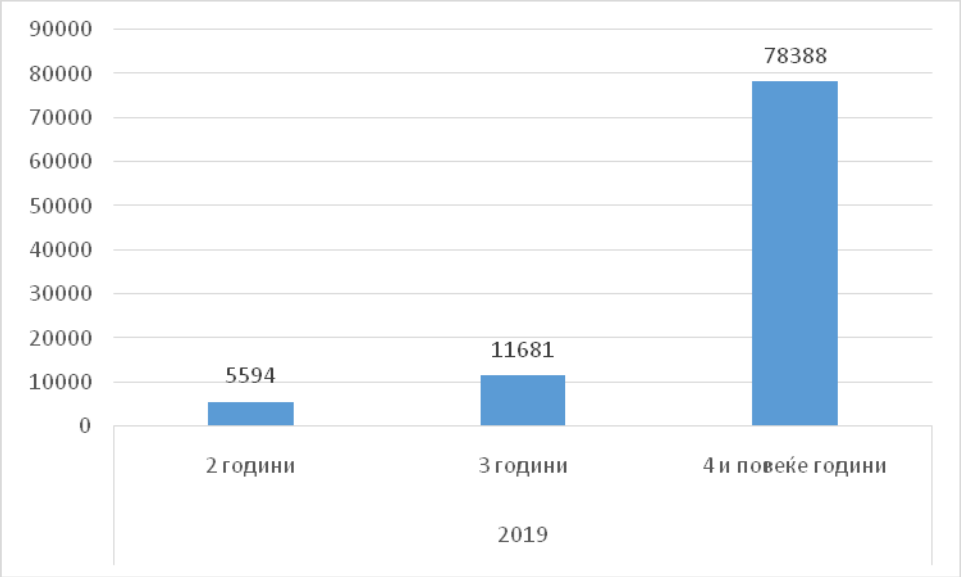


Figure5. average value of migration 2018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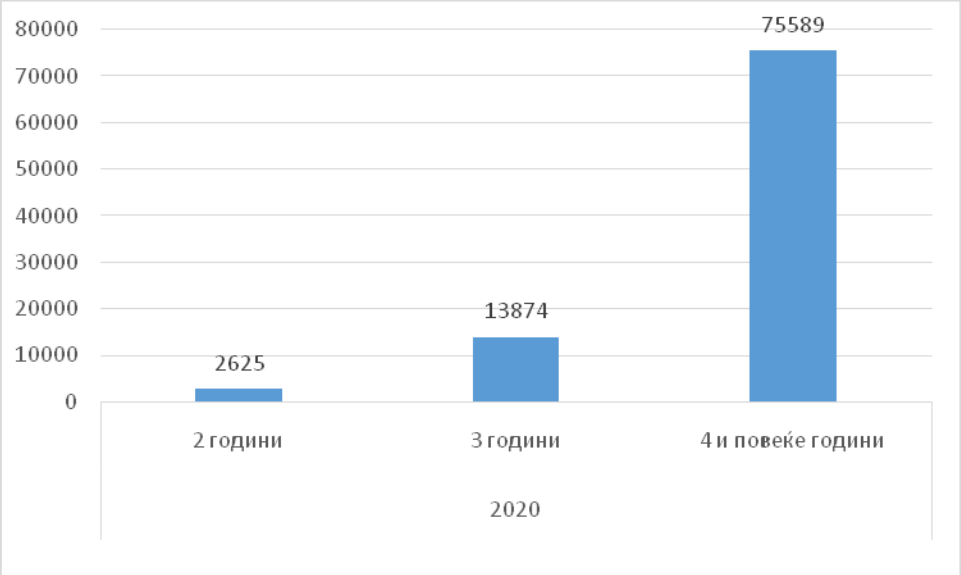
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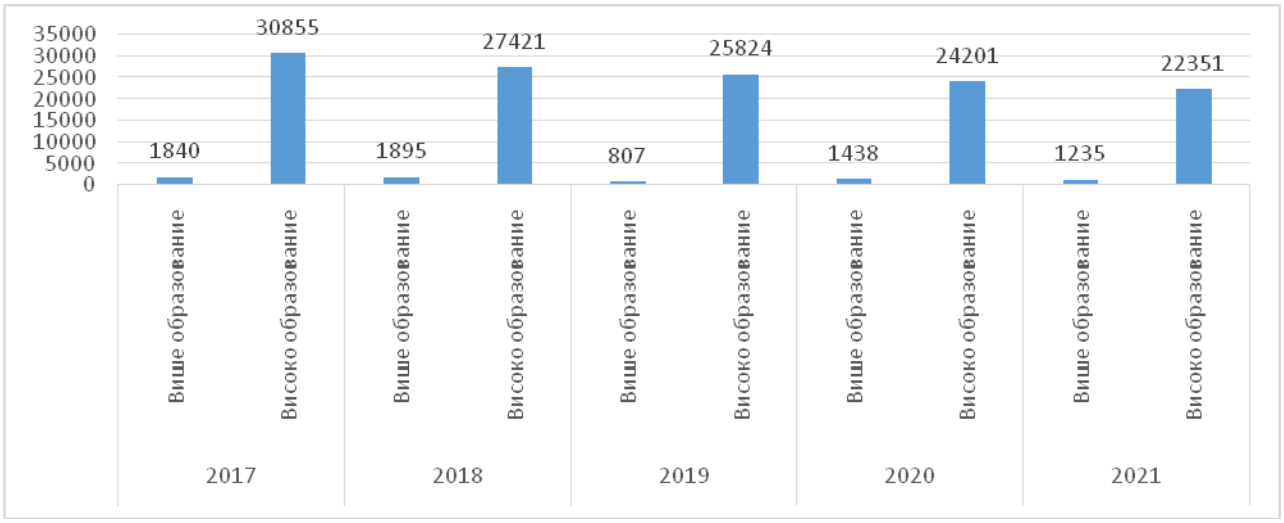

Figure6. average value of migration 2019,2020,2021 Comparison

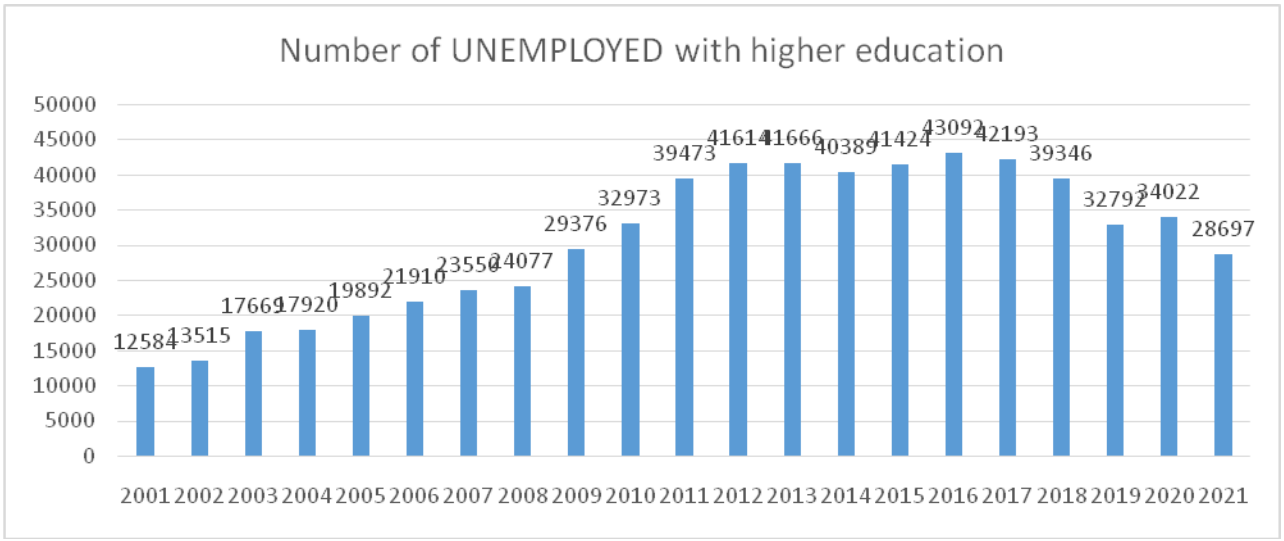

Figure7. Number of UNEMPLOYED with higher education

What is the loss to GDP with the young man's departure?

Instead of in his own country, the emigrant works on the social product of another country.

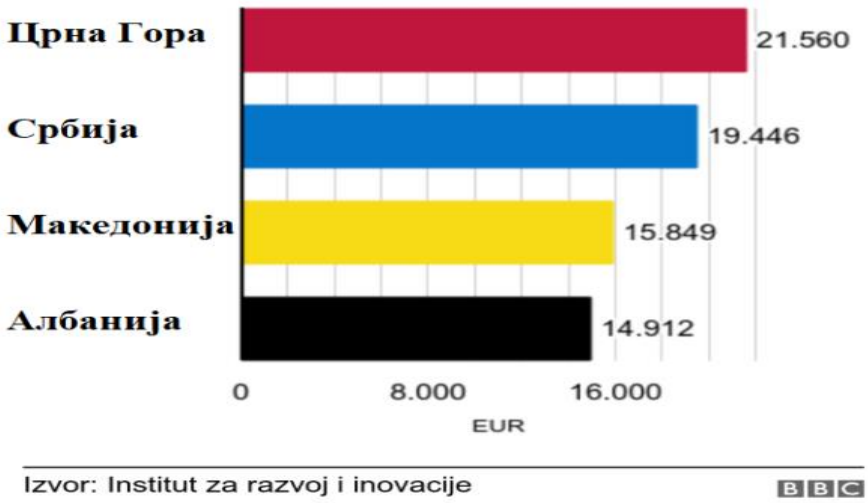

Figure8. Loses in GDP of Western Balkan countries

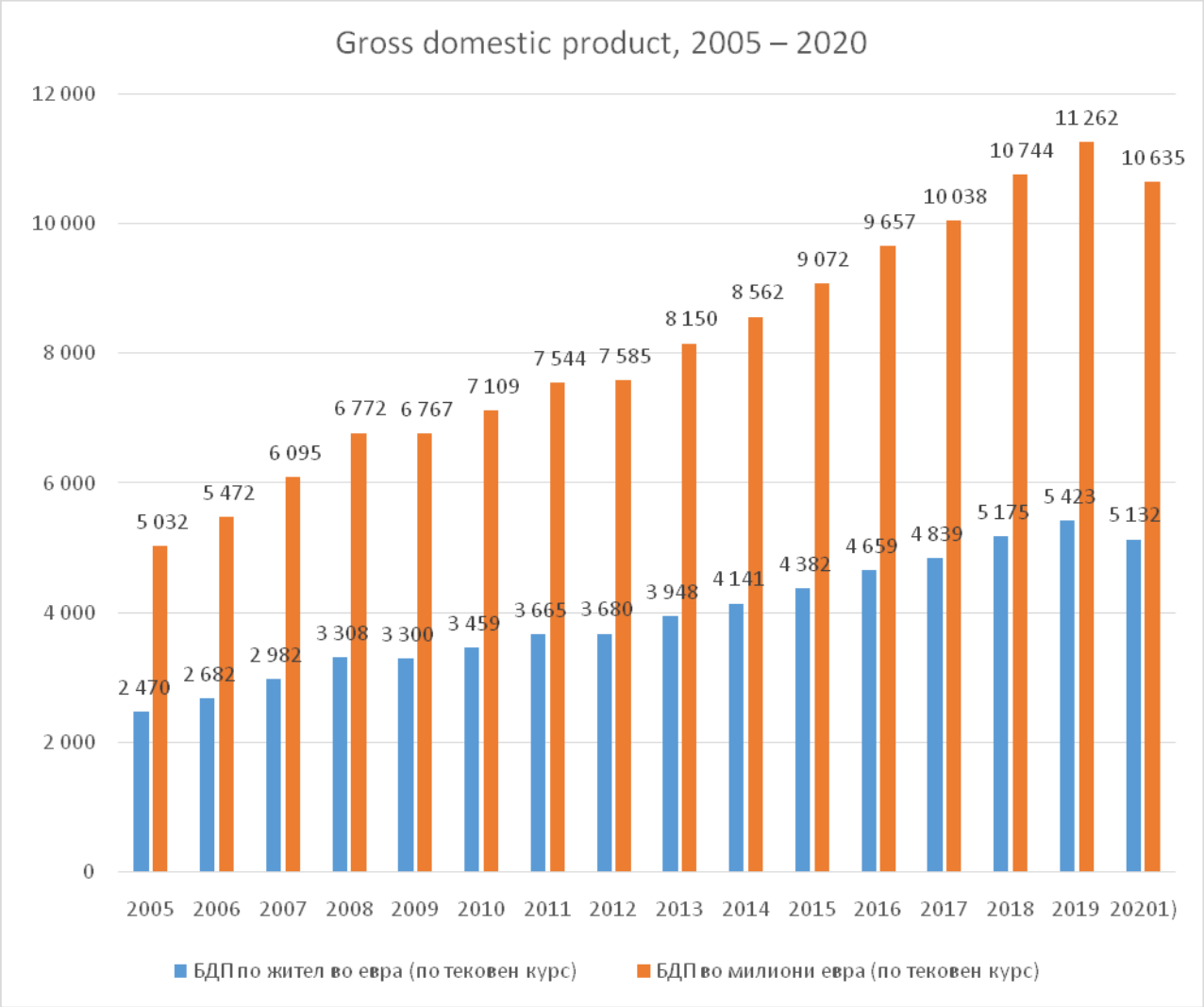

Figure9. Gross domestic product, 2005 – 2020

COSTS FOR EDUCATION IN THE REPUBLIC OF NORTH MACEDONIA

How much does the education of an emigrant cost? How much do Balkan countries invest in a graduate who later leaves the country?

2000x28.934=57.86

2000X55,500=110mil EURO

6. Strategy for reverse brain drain

The researchinto more suitable approaches for addressing the brain drain phenomenon at local and regional levels have been realized and the strategy is a s follows.

1. The first step is to raise awareness of the brain drain phenomenon and its characteristics

Evidence has shown that there are instances where policymakers were not fully informed on the occurrence of brain drain

Design strategies to frame cooperation.

Adopting a Triple Helix approach in which the prime player is Academia as the main driving force.

Industry role?

3. Create opportunities for broad scope interaction

Reverse the brain drain and get back some of the “best and brightest”. Scope intervention: experts, students who have been finished their studies in developed countries, employed academic staff, etc

Effort to do so needs to be proactive, impactful, comprehensive, and collaborative.

4. Identify and support key driving sectors

Global talent to work in various professional positionsICT, Technical Sciences, Technology, Economy, etc

5. Support, invite and interact

Invited to engage all professors, experts from the industry, qualified staff, Doctor of Science, with scientific vocation associate professor and above, who currently work in various world universities, to come and contribute to the University 'Mother Teresa' in Skopje, in the departments and faculties that Mother Teresa has.

6. Build on job opportunities generated by industries that are human capital-intensive.

Collaboration with Industry on initiating projects for self – employment of bright experts

7. Synergise resources for talent-based growth

Synergy aimed at collaboration within 5 driving forces:

1) government, 2) fond for innovation, 3) municipality, 4) industry and 5) academia

To attract and retain young, highly skilled people working in R&D, and PhD graduates in particular.

8. Innovations and R&D opportunities

Opportunities aimed at attracting international researchers, designed to contribute to the Regional Innovation Strategy.

Attracting researchers and promoting mobility of scientists, at least for a short mobility period should be prioritized, as well as fostering education-related aspects of competitiveness, transparency and engagement in local communities.

9. Opportunities in Teaching

Opportunities aimed at attracting international academic staff in teaching using different ERASMUS, COST and other projects for funding.

7. CONCLUSION

The research study provides a review analysis of brain drain, causes, losesand has tried to fill the vacuum of qualitative research work on some ofthe reasons for and aspects of the flow of highly skilled migrants from North Macedonia. First,it surveyed the roots, manifestations and effects of the process of brain drain. Then,it analyzed the different fields and loses of North Macedonian institutions, arguing that therehas not been a coherent, solid evidence-based policy, strategy or plans to alleviatethe detrimental effects of the gradual diminution of human resources caused by braindrain. The original contribution of the paper lies in its field research component,which investigated causes, loses and proposes a strategy how to solve the problem and reverse brain drain.

Apart from the future lost contribution to the social product, when emigrating, the young person also takes with him what was invested in him until then.Both countries and families invest in education - until the young person leaves the country, it is an investment.When you compare the amount of how much the countries of the Balkans invest in education, and how much Germany invests, it can be concluded that the countries where young people go get experts and ten times "cheaper" than those that the countries themselves educate.

Professional engagement of intellectual emigration representatives in higher education and private sector

Increasing the intellectual exchange with foreign countries by encouraging cooperation with educated individuals from the Republic of Macedonia who live and work abroad with Macedonian scientific and research institutions and development companies.

Based on the discussed framework, obviously there is an Emergence of Brain Drain Research. Strongly is encouraged further research on this topic, active participation in addressing Brain Drain and mapping out the national and international plans on the conversion to Brain Gain.

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Organizational culture and Leadership as predictors of motivation in an organization

Artina Zeqiri, Izet Zeqiri

[1] Artina Zeqiri; artina.ze@gmail.com
[2] Izet Zeqiri; i.zeqiri@seeu.edu.mk

Abstract: Leadership and organizational culture are two areas that have been in interest of a lot of authors. Empirical findings show link between leadership, culture and performance in anorganization;however, this paper will examine the influence of leadership and culture in employees' motivation in business entities in North Macedonia. This study sampled 390 organizations with a view to analyze the influence of these two concepts in employee's satisfaction at their work. There are evidences that relationship between leadership and performance is mediated by the organizational culture but regarding to our responses, employees showed a higher motivation influence from their leaders than from the organizational culture. Likewise, employees who rated their organization as being high in performance orientation trusted their superiors more than employees who rated their organization as being low in performance orientation and organizational culture.

Keywords: Organizational culture; leadership; performance; motivation, employees,North Macedonia.

1. Introduction

Researchers have examined the links between leadership styles and performance (Howell & Avolio, 1993) and between organizational culture and performance (Deal & Kennedy, 1982) which resulted in a strong relationship.

Organizations with constructive cultures have group norms that promote achievement, participation in decision-making, teamwork, social support, constructive interpersonal relations, and self-actualization. In these organizations, employees are encouraged to interact with fellow-workers and approach tasks in ways that will help them meet their higher-order satisfaction needs. (Simosi & Xenikou, 2010). It is generally accepted that an organization's culture develops, to a great extent, from its leadership while, at the same time, organizational culture has also an impact on the development of its leadership (Bass & Avolio, 1993)

Despite the link between these two areas, leadership and organizational culture as an important part of organizational theory, little critical research has been addressed in understanding the link between these two concepts and their impact in employees' motivation. On the other hand, empirical literature has provided a positive relationship between employee motivation and organizational effectiveness or performance. If the leadership approach toward employees is increased by empowering and recognition, their motivation to work and productivity to achieve organization's goals will improve, as well as their accomplishments and organizational performance. Also, empirical evidence suggests that the relationship between leadership style and performance is mediated by the form of organizational culture that is present (Ogbonna & Lloyd , 2000).

This paper aims to examines the relationship between leadership and organizational culture and their implication in employee's motivation toward work and productivity in organizations. The paper begins with a brief review of the literature on organizational culture and leadership. This is followed by a discussion of the methodology adopted for the study and the presentation analysis of responses to a mailed questionnaire exploring the links between the two concepts and performance. The evidence demonstrates that the relationship between leadership and employee's motivation is mediated by the nature of organizational culture. Referring to (Lawal and Outwashes') research we can see the link between leadership, employee's motivation as important part of organizational culture and organization performance. Employees who rated their organization as being high in performance orientation trusted their superiors more than employees who rated their organization as being low in performance orientation. (Lawal & Oguntuashe, 2012). So importance of Leadership in Organizational Culture is indisputable because by a successful organizational culture defining the mission of an organization and motivating employees to achieve that mission, leadership builds the foundation of company culture. On the other hand, leaders have a big impact on company culture by setting the agenda, prioritize work, manage, lead, and delegate. Regarding to our study we can conclude that strong leaders provide a sense of vision, purpose, mentorship, and inspiration to those they lead and strong Organizational culture depends on a leader's ability to communicate the company's core values, mission, and goals. The final part of the paper has the conclusions and recommendations.

2. Literature Review

Several studies indicate that leadership significantly influence employee innovative behavior. Employees exhibit intuitively their personal attributes like personality, aptitude, intelligence, creativity, knowledge, and skills in most situations; so, in an organization leaders certainly bring these attributes to bear in influencing their followers toward goals and objectives of the organization. Another empirical study of Australian executives regarding the relationship between leadership and organizational culture, indicated that transformational leadership and transactional contingent reward were more salient predictors of culture than culture was of leadership. (Sarros, Gray, & Densten, 2002). This means that leaders demonstrating contingent reward behavior are likely to inspire feelings of honesty, faith and trust to their followers which is manifested in all aspects of their relationship with each other (Aronson, 2001)which motivates them toward productivity and organizational efficiency.

Sarros J. (2002) show that leadership is a stronger predictor of culture while Block (2003) indicates that immediate supervisors have a greater influence on employee perceptions of culture than do higher leadership levels.Frederick Taylor's (1911) theory, organizational leaders would forge a culture that places high priority over productivity and performance at the expense of the wellbeing of the human worker doing the work. Forty-nine percent of CEOs are concerned about developing the leaders who will succeed them as part of their human resources strategy and talent recruitment process. Because various ways in which work-related well-being can be defined Warr(2002). Leader behavior (e.g., leader consideration, supportiveness, receptiveness of employees' needs, leader–member exchange) has been examined as an antecedent variable in regard to affective and normative commitment. (Mathieu & Zajac, 1990)

Egan , Yang and Bartle(2004).in their study on effects of organizational learning culture and job satisfaction have examined the relationship of organizational learning culture, job satisfaction, and organizational outcome in the United States with a sample of information technology (IT) employees. From the results they found that learning organizational culture is associated with IT employee job satisfaction and motivation to transfer learning. Also, turnover intention was found to be negatively influenced by organizational learning culture and job satisfaction (Egan , Yang , & Bartle, 2004).

One of studies that shows a significant connection between elements of organizational culture and employees' motivation is the one by Mahal and Prabhjot(2009).They think that organizational climate as a important element of organizational culture has a potentially rich, but generally unrealized role in the development of an organization as well as to raise the motivation of employees. Researchers perceive problems arising from significant culture and different climate affecting the management and leadership decisions and motivational level among the employees. Among 100 adult employees working in Ranbaxy with the help of various questionnaires, Mahal and Kaur's have examines the influence of organizational culture and climate on the motivation level. The results show that organizational climate factors such as environment, teamwork, management effectiveness, involvement, reward and recognition, competency, and commitment, have been found to influence the motivation and viewed as a multidimensional construct. The results indicate that all eight variables are positively related to the motivation. The study's recommendation explains that to improve the motivation level among employees one must try to improve the organizational culture and climate. (Mahal & Kaur, 2009)

Another study done in Ibadan Nigeria showed positive and negative correlation between leadership style dimensions and organizational performance. It was also found that leadership style dimensions

jointly predict organizational performance, which counted for 23% variance of performance. The study concluded that transformational and democratic leadership style should be employed by the Banks' management in order to wax stronger in a global competitive environment. (Ojokoku, Odetayo, & Sajuyigbe, 2012).

2.1. Organizational Culture

The word "culture" is defined in different ways, however what defines it as organizational culture means the common system of attitudes, beliefs, values and behavior in the organization. (Robert Gilbson, 2002). Hofstede called organizational culture the "collective mental program." Meanwhile Schein says that culture is a very complex concept which can explain everything and nothing. People in a company think, feel, value and act, guided by ideas, meanings and beliefs of a cultural (common social) nature. Culture within an organization therefore consists of the beliefs, norms and values that a certain group of people share and can be seen as a challenge for businesses operating internationally (Edgar H Schein, 1984).

Schein (2010)in elaborating the concept of culture concludes that: if one understands the dynamics of culture in the organization, individuals within it will find it easier to cope with stress and worries while dealing with previously unknown situations. But there are findings that organizational culture and performance are clearly interrelated (Richard , Brief, & Guzz, 1990). Through organizational culture employees understand the history of their organization as well as the way they operate in that organization. Employees while recognizing the organization understand its values, norms and rules, which leads them to common sense with other employees and motivates them to achieve the goals of the organization and increase the performance of the same. This proves the fact that the organization achieves effectiveness when, despite personal differences, employees share the same values and the same goals and quality at work in order to advance the organization.

It is evident that in most organizations the working atmosphere is much more motivating in cases where we have an organizational culture that respects the basic principles of employee development, leaders contribute to increasing the reputation of both employees and the organization in order for people within it to feel valued and give the best. Regarding to this Sharma's paper on impact of organizational culture on job satisfaction of the employees that was conducted in three Information Technology companies in Maharashtra (India), with an sample of 220 IT professionals. The findingsof this paper reveal that organizational cultural values such as fairness, growth opportunities and reputation of organization have a positive effect on the job satisfaction, whereas organizational traits like aggressiveness have a negative influence on job satisfaction (Sharma, 2017).

Based on all these studies, our research will reflect a real state of the relationship between organizational culture and employee motivation in the organization. Given that the performance of an organization depends on many elements but one of the main ones is employee productivity, this hypothesis raised in our study will help us understand more about this relationship of these two variables. Hence our second hypothesis was formulated, and inferential statistical tool was used to analyze the data specifically Pearson product moment correlation was used to examine the relationship between organizational culture and employee' motivation. Based on the literature review we can suggest the following hypothesis:

H1:Organizational Culture has significant impact in predicting employee motivation?

Other studies that were focues on manager's prespective about the topic showed that they thing that on human resource management specified several factors having direct impacts upon individual and organizational effectiveness. Research data in Biswas's studyon organizational culture and transformational leadership was collected from 357 managers/executives of different organizations in India and the research was found to have important bearing upon human resource development and the performance of individual employees. The study explores the effect of organizational culture and transformational leadership on individual's intention to quit his/her present organization. (Biswas, 2009)

2.2 Leadership as predictor in motivational

Researches have shown findings that the failure to communicate by leaders or misunderstandings in the organization can lead to disruption or failure of the work process, which means loss for the business. In Buhler and Worden's study of internal leadership communication, it is stated that with more than 100 employees had not a proper communication style or misunderstandings during internal communication, which resulted in increased financial costs with a load of $ 420,000 per year, which has affected the profitability of the enterprise. (Buhler SPHR, 2013). This loss can be serious demotivation for employees and also a big demange for the organization in achiving the performance efficency.

Leaders have been identified as providing direction, inspiration, and guidance in the organization. Regarding to some emipirical data good leaders exhibit courage and confidence in the workplace. They identify the strengths and talents of their people and build teams committed to achieving the organizational's goals.The impact of leader behaviors on motivation levels of employees was examined in lot of studies and researches. Some researches has shown that communication competence and leadership style were used to predict specific employee outcomes.

In Mikkelson, York, & Arritola's(2015).' research has been concluded that supervisors communication competence and leadership style were used to predict specific employee outcomes. In the study, 276 participants working in various industries completed measures of communication competence and leadership styles about their direct supervisor along with measures of their job satisfaction, motivation, and organizational commitment. So the concludion as it was predicted, effective and appropriate communication were both positively related to satisfaction, motivation, and organizational commitment. But the leadership styles showed that have been crucial in employee's motivation. Relations-oriented leadership styles were positively related to all three employee outcomes as well. In the end, regression analysis determined that effective communication and relations-oriented leadership were the best predictors of satisfaction, motivation, and organizational commitment (Mikkelson, York, & Arritola, 2015).

Pool in (1996).has reached results from 125 adult Americans between the ages of 20 and 46 years where he has examine the predictive values of substitutes of leadership, leadership behavior, and work motivation in relation to job satisfaction. The results revealed that all but subordinate substitutes were significant predictors of job satisfaction. In the stepwise analysis, task substitutes, organizational substitutes, consideration leadership behavior, initiating structure leadership behavior, and work motivation were significant and together accounted for 54% of the total variance of job satisfaction. In both the stepwise and independent analyses, work motivation (expectancy theory) and consideration leadership style affected levels of job satisfaction more than any other variables (Pool, 1996).

Reagarding to this what we want to achieve is to ascertain whether there is a direct link between the way we lead, or the leaders and the motivation of the employees in the organization. Hence our first hypothesis was formulated and inferential statistical tool was used to analyze the data specifically Pearson product moment correlation was used to examine the relationship between leadership and employee' motivation.Based on the literature review we can suggest the following hypothesis:

H1: Leadership is a predictor of employee' motivation?

Fiaz, Qin, Amir, and Saqib (2017)in their paper for *Leadership styles and employees'* motivation has been showing thatthe positive relationship between democratic leadership and employees' motivation comes out to be insignificant, which depicts the bureaucratic and decentralized nature of the organization. The research findings are in line with the theoretical assumptions for autocratic and laissez-faire style, but inconsistent with democratic leadership style. Autocratic leadership style is found to be more dominant and exhibits significant negative relationship with employees' motivation, whereas democratic and laissez-faire leadership styles are shown to positively predict motivation of employees. (Fiaz, Qin, Amir, & Saqib, 2017).Therefore our hypothesis could show us the relationship between leaders or their leadership style and employees in the organization, analyzing whether leadership has an impact on employee satisfaction, whether it is a predator of employee motivation to achieve the goals of the organization.

2.3 Organizational Culture and Leadership influence in organizational performance

However, Schein in his book "Organizational Culture and Leadership" explains culture from the objective to the subjective, as is the character and personality of the employee. He says that by understanding culture we will be able to understand ourselves and individual characteristics, noticing the forces that influence and defining us for who we really are. Then we realize that our personality and character is reflected by the group we stand with, or the one we belong to within the organization. Organizational culture is not just about us in but also within us, it about the leadership.Hofstede, Neuijen, Ohayv and Sanders argue that organizational culture is as important within an organization as structure, strategy, and control, which are very important managerial elements of leadership and should be consistent in theory and practice of organizations (Hofstede, 1990).

According to research by Slijepčević, Bovan, and Radojević, leaders need to be willing to listen to ideas and alternatives from employees and then discuss them. Their research shows that leaders have had informal and unstructured communications about work with their employees, bringing more subjectivity, increasing the level of emotionality at work, empowering and stimulating them to be more productive in achieving goals, creating work atmosphere and motivating them for a better business performance. (Slijepčević, Bovan, & Radojević, 2018).

3. Research Methodology

This paper aims to explore the importance of organizational cultures and leadership in motivating employees in business organizations in the Republic of Northern Macedonia. The main research question is: Do organizational culture and leadership influence the employee's motivation and the performance of organizations in the Republic of Northern Macedonia?The research's approach is the main part of choosing the methodology, which is done as a plan consisting of the vehicle assumption for the detailed method for data collection, analysis, and interpretation. In this paper, the research approach will be

divided into two categories: the data collection approach and the data analysis or processing approach. The methods in the paper are used as follows: Method of analysis and synthesis; Method of induction and deduction; as well as the survey method. This chapter describes the methodology used to conduct research related to data collection, sampling, questionnaire formulation, survey process and data processing methods. Focusing on research methods will help us reach conclusions, gather information, and interpret it. The methodology is a meaningful approach, which supports the researcher in answering the research questions to test the hypotheses raised to achieve the research goals.

Our paper has a descriptive research and is based on the collection of primary data. The research method is the deductive method, starting from the existing theories to the conclusions based on the research results. The primary data source was collected from the questionnaire which was constructed of three parts related to communication and organizational culture. The data were processed with STATA 13 program and were analyzed through descriptive analysis. During the analysis, the correlation coefficient calculates whether there is a linear relationship. The correlation coefficient is denoted by "r" and takes values from −1 to +1. The coefficient that has been used in our research is the Pearson coefficient which seeks the answer to the question of whether there is an important relationship between the two variables. If, r = −1; there exists a complete negative linear relationship, if r = 1; there exists a complete positive linear relationship and if r = 0; there is no relationship between the two variables.

3.1 Data Collection

Questionnaires and interviews were used as a method of collecting primary data for the research. The survey was conducted through direct and online contact, always based on the target groups such as employees, owners, CEOs, department managers. Communication with respondents is made in such a way that the target groups could express their opinion on the issues raised, their perception in the workplace, the advantages and disadvantages of organizational culture, the relationship with leadership at work as well as impressions for the work environment, all this is done while maintaining complete anonymity. The questionnaire was sent to private and public institutions as well as to credible organizations as well as established communities to support the private and business sector in the RNM.

While collecting data from respondents, to them was given the opportunity to express themselves more freely through open-ended questions, which made a primary contribution to the qualitative analysis of the research. Out of 390 surveys, 58.8% were women and 41.5% were men, of which 37.8% are in leadership positions and 62.2% are administrators or employees.

4. Results

Based on the research conducted, most of the employees in business entities in the Republic of North Macedonia, say that they are not fully aware of the organization where they work. Employees face lack of timely internal communication or slow communication, which delays the work process and creates dissatisfaction. From the perspective of employees and their responses is confirmed the fact that the leaders of organizations in the RMV, do not regularly inform employees about the overall functioning of

the organization which reflects on the effectiveness and efficiency of the organization.The majority of respondents of our research about 42 percent are employees, administrators or any other position in the organization. We can say that out of the total respondents about 35 percent of them have been in leadership positions, while 68 percent of employees in various sectors in the organization.

Based on statistics on how satisfied the employees are with their leaders, it results that 33 percent of the respondents are sufficiently satisfied with the leaders in their daily communication and behavior in the organization, motivating them and influencing their satisfaction. Theirs. 28.25 percent of them to be very satisfied, 26.25 percent to be partially satisfied, while about 12 percent dissatisfied with the same.

Hypothesis H2: Leadership is a predictor of employee' motivation

Testing of hypothesis H1a results that the value p = 0.008, given that p <0.05, and in our case the value p is less than 0.05, the 95% reliability criterion is met, and the hypothesis is accepted. Based on the test it turns out that there is a strong link between the communication of managers or leaders with employees and the success of the organization.

TEST					
Pearson chi2(72)	=	104.044	Pr	=	0.008
Cramér's V	=	0.2945			
gamma	=	0.1345	ASE	=	0.082
Kendall's tau-b	=	0.0676	ASE	=	0.042
Fisher's exact	=		0		

Evaluation

Pearson chi2(72)	=	104.044	>	92.81	**= Chi-SD**
Pr	=	0.008	<	**0.05 reliability coefficient 95%**	

Organizational culture is a system of values and beliefs that makes employees feel valued, feel important in achieving the goals of the organization. However, about 43 percent of employees in the RMV are not motivated by the approach of organizations and the work culture really feels undervalued. Only 30 percent of them say that organizations pay attention to the work atmosphere, creating unique values, collectivity, and cooperation between employees towards its goals. According to them, work culture and

sense of cooperation of leaders are factors that influence the motivation of employees. The results show that a significant number of employees in various organizations in the country, have the impression that their organizations have no interest in promoting organizational behavior and investing in human resources, which reduces the satisfaction of their performance in the organization.

As one of the basic elements of organizational culture are the knowledge of the vision, mission, goals, and objectives of the organization by the working staff. In our case only 36.25 percent of respondents are moderately informed about the goals and objectives of the organization, while 27, 50 percent say they are fully informed about them. Limited amount of information has 1/8 of the respondents respectively 13.25 respondents.

Hypothesis H1: Organizational culture is a predictor of employee' motivation

Based on the results from the testing of hypothesis H2 it results that the value p = 0.515, given that p <0.05, and in our case the value p is greater than 0.05, the reliability criterion of 95% is not met and the hypothesis is not accepted. Based on the test, it results that in the organizations in the Republic of Northern Macedonia there is no strong connection between the organizational culture and the performance of the employees.

TEST			
Pearson chi2(4) = 2.6583	Pr = 0.617	Pr=0.515	
likelihood-ratio chi2(4) =	3.2619	Pr = 0.0815	
Cram鋘s V =	0.0815		
gamma =	0.1369 ASE	=	0.178
Kendall's tau-b =	0.0281 ASE	=	0.037
Fisher's exact =		0.714	

Evaluation					
Pearson chi2(4)	=	2.6583	<	9.4877	**= Chi-SD**
Pr	=	0.515	>	**0.05 reliability coefficient 95%**	

5. Conclusion

Organizations in RNM must raise awareness at all hierarchical levels, about the importance of effective leadership communication. On the other hand, leadership of organizations should increase employee motivation, sharing important information about the company's strategic planning; when employees will be informed about the goals, mission, and vision of the company. They should communicate clear objectives and their contribution to the realization of the same, motivating them as winners of the success of their organization. This opens opportunities for open discussion, generation of ideas, creativity at work and strengthens the connection. employee-leader.

Leaders of organizations in the RMV should increase awareness of organizational culture, its advantages and impact on the organization. They need to create a common system of values and beliefs that makes employees feel valued, motivated, feel important and contributing to the realization of the goals of the organization.

As hypothesized both organizational culture and leadership were found to be significantly and positively related to employees' motivation in RNM.A possible interpretation of our finding could be that, in more recent years elements of organizational culture and leadership like clarifications of employees' responsibilities, empowerment, creating space for their professional growth, communication, shared vision, mission and goals of organization, performance criteria and expectations of leadership can be key factors in employee motivation, job satisfaction, and their productivity toward organizational success.

The results obtained from this survey in business subjects in RNM can be further material to future research in order to see the effectiveness of leadership ,work culture and leadership styles in an organization and to analyze what will be most suitable for the current organizational conditions to be able to increase work motivation that affects the performance of employees in RNM. Also regarding to these problematics can be raised other variables that support the research because the more interesting the research variables are the wider results can obtain the development of organizational development and success.

The impact of this research is based on analyzing the importance of factors such as organizational culture and leadership and also to prove that the role of leadership in the formation of organizational culture to display work motivation on employees is important in organizations in North Macedonia. Leadership role on conducting the goals of the organization is one of the important points to encourage motivation in workplace, that's why leadership has to ensure the culture that exists in the organization to be accepted and understood by all employees to be united in achieving the organizational goals. Overall, we can say that this research has an important impact in explaining that, leadership provides a role in shaping an understanding of the organizational culture of the company so that it can encourage motivation to work on employees.Thus, our approach shows that there is an interconnection between these two factors as influencers in the environment and satisfaction in the company. This interaction will make a greater contribution to team communication and collaboration and will encourage to accomplish the mission and vision of organization.

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Economic and Financial crime: New trends in the fight against this type of crime

Genti Rechi

University ,, Mother Teresa"- Skopje

Email: genti.reci@unt.edu.mk

ABSTRACT

The main objective of this research study is to analyze the impact of economic and financial crime on the states and society and the measures taken to combat this crime. Economic and financial crime are one of the most widespread crimes on the society. The main goal of the paper is to make an overview of the negative effects that this type of crime has on economy of the states and its development. The research, also aims to present the latest trends in the fight against economic and financial crime with special emphasis on asset recovery.

In this paper are used several research methodologies. The normative method will be used to analyze laws and instruments adopted to combat economic and financial crime. Also, we will use data from various sources such as State statistical office, courts, financial police and other relevant institutions to analyze the impact that economic and financial crime has on the economy and development of the states.

From the conducted research, we conclude that one of the prerequisites for sustainable development is the rule of law and the functioning of the legal state.

Key words: Economic and financial crime, rule of law, asset recovery, development,

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