PROCEEDINGS OF THE FIRST AND THE SECOND INTERNATIONAL CONFERENCE "RESEARCH, APPLICATION AND EDUCATIONAL METHODS"

RAEM

UK FAN S. NOLI

FAKULTETI I SHKENCAVE NATYRORE DHE HUMANE · UNIVERSITETI FAN S. NOLI KORCE

RAEM

RESEARCH APPLICATION AND EDUCATIONAL METHODS

Korçë, Albania
24 May 2019
and
10-11 September 2021

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NOVEMBER 2022

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MAY 2019

Organized by the Faculty of Natural and Human Sciences, "Fan S. Noli" Universitety Korçë, Albania

in cooperation with:

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- University of West Macedonia, Greece
- Albanian Association of Medical Physics
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HUMANITIES AND SOCIAL SCIENCES

(SHKENCA HUMANE DHE SOCIALE)

THE IMPORTANCE OF THE TEACHING TOOLS AND TECHNIQUES FOR STUDENTS WITH AUTISM

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Abstract
The challenges of teachers who work with students with special needs in general and with autistic students in particular, face difficulties which are related to the fulfilment of their primary duty concerning the full development of their intellectual potential. It was considered as reasonable that through this study, to identify the concrete case of 2 – year's progress of a student in primary education with autism spectrum disorder ASD. The main purpose of this study is related to the importance of the effects of techniques, the tools used by the assistant teacher in the Psychological Development of Students with Special Needs. In a general perspective, a description of the case study will be initially made based on the theoretical aspects of the autism spectrum and then, it will be presented the history of the condition and the progress of the concrete study case. A particular importance will be given to the treatment of techniques, tools that promote the psychological development of students with autism since the issues coming from their usage affect issues related to teachers' background, student recognition and the effect of techniques in the student development. The methodology used for this study case will be mainly based in testing techniques of teaching and tools for the students with autism which will be further completed with interviews (opinions) of the teacher, psychologist and parent of the child. In conclusion, the best experiences will be presented as positive examples for other teachers in order to use them in similar situations and to succeed in meeting the challenges of the child development with ASD.

1. Introduction

Working with students with special needs encounters teachers with difficulties which require a wide theoretical and practical background.Daily activities of the assistant teachers bring difficulties and problems related to the nature of the needs of the student with whom they work. In this context, beside the recognition of the nature of his difficulty, the teachers in every activity organized with students must have good creative and implementing skills in the development of students with special needs.

Taking into consideration the importance of the techniques, tools used to assist in the development of students with special needs, a case study was considered as valuable to assess their impact on the development of students with autism.In an overview of the paper, a theoretical presentation of autism-related issues will first be considered, to further continue with the concrete case study of a student with autism and the challenges of the assistant teachers, by focusing on the tools they use in stimulating their development.

Regarding the case study, there will be given a general description starting from the initial condition of the student, the plan up to the selection or adjustment of necessary tools assisting work process of the assistant teacher.The methodology used will focus on three directions, starting with the planning tools (based on the student's diagnosis) and using assessment forms during their implementation to identify effectiveness in developing their needs as well as the teacher, psychologist, parents' opinions, etc. The results of the study will not only serve to determine the most effective tools that meet the needs of the case study but they will also serve as positive examples to be implemented to other students from the assistant teachers.

2. Autism Spectrum Disorder (Theory)

2.1 Autism spectrum disorder

Autism or Autism Spectrum Disorder (ASD) is one of the most issues discussed by teachers nowadays as they face difficult challenges on

how to accomplish the main purpose on working with children with special needs. Numerous publications on autism and its forms help them to learn more about the disease and find more space to work with students.

But how is the condition of children with autism today?

According to a recent study (AutismSpeaks, 2018) it results that there is a significant increase in children with autism in the United States of America; 15% of children aged 8-11 years by determining a ratio of 1 in 59 children diagnosed with autism. In Albania, according to (Gazeta-Shqiptare, 2018), alarming figures of children with autism are also emerging; 1 in 68 children are born with autism All of these cases point to an alarming situation that confronts society with a worldwide challenge.

The beginnings of autism date back to 1911 by psychiatrist Eugen Bleuler who defined autism as a form of schizophrenia.In the case study(Kanner, 1943) was presented a series of cases of children with behavioural disorders making a significant contribution to the treatment of behavioural disorders, autism and one year later, in 1944 Hans Asperger published his four-case study which defined the term "autistic psychopathy".Numerous studies have been conducted from this period onwards, studying the behaviours of children with autism to discover the causes and symptoms.

Children with ASD are just like other children they also have individual styles and preferences. However, they express preferences and styles in a form different from others. (Wills, 2006).

According to (World Health Organization, 2017) ASD refers to a set of conditions characterized by a degree of behavioural, communicationand language impairment, a narrow range of interests and activities thatare unique to the individual and repeatedly performed. ASD occurs in childhood and tends to persist into adolescence and adulthood. In most cases the conditions are visible during the first 5 years of life.

Whereas (National Autistic Society, 2016) defines ASD as a lifelong disability that affects how people perceive the world and interact with others.People with ASD see, hear, and feel the world differently than other people.All autistic people share certain difficulties, but being autistic will affect them in different ways. Some autistic people also have learning disabilities, mental health issues or other conditions, which means people need different levels of support.All people on the

autism spectrum learn and develop. With the right kind of support, everyone can be helped to live a more satisfying life of their choice.According to (Copeland, 2018) ASD autism spectrum disorder is a complex developmental condition that involves ongoing challenges in social interaction, verbal and nonverbal communication, and restricted / repetitive behaviours. The effects of ASD and the severity of symptoms are different in different persons.

In a summary of the autism description by (H&A Wilson Fondation, 2016) it is described as a generic term for a complex set of brain developmental disorders characterized by difficulties in social interaction, verbal and nonverbal communication as well as repetitive behaviours. Scientists are not sure what causes ASD, but two factors are defined as essential, such as genetics and the environment. They have also identified a number of genes associated with the disorder. Studies of people with ASD have found irregularities in some areas of the brain. Other studies suggest that people with ASD have abnormal levels of serotonin or other neurotransmitters in the brain. These abnormalities suggest that ASD may be due to disruption of normal brain development early in fetal development caused by defects in genes controlling brain growth and regulating how brain cells communicate with one another, possibly due to the influence of environmental factors on gene function.While these findings are intriguing, they are preliminary and require further study, while the theory that parental practices are responsible for ASD has been rejected long ago.

To conclude, according to (CDC, 2018) people with ASD often have problems with social, emotional, and communication skills.They can repeat certain behaviours and do not want to change their daily activities. Signs of ASD begin during early childhood and usually last throughout a person's life.

Children or adults with ASD:

-       They show no interest in an object point and do not look at the object when another person points at them.
-       Have problems with others or have no interest in other people.
-       Avoid eye contact and want to be alone.
-       They have difficulty in understanding other people's feelings or talking about their feelings.

- They prefer not to be held or hugged only when they want to.
- They are not aware when people talk to them, but they respond to other sounds.
- They are very interested in people but do not know how to talk, play or relate to them.
- Repeat the words or phrases directed to them, or repeat words or phrases instead of normal language.
- They have difficulty in expressing their needs.
- Repeat actions over and over.
- They have difficulty in adapting when the routine changes.

All of these help us to study cases of autistic children based on them so as not to create difficulties.

2.1. Autism and school, assistant teachers' challenges, tools to help in developing students with autism

The first part of the study summarized the autism issues starting from the beginning, causes, symptoms, and condition of those affected with autism today. The following part will study the integration of children in social life, especially in schools, as an important institution of including students in knowledge without discrimination.

Apart from the clinical treatment of children with special needs, inclusion in the social life of the school is the best therapy for their development even at a minimal level since the very purpose of the school, as it also defines (National Curriculum in England, 2014) in one of the main goals of the school "promotes the spiritual, moral, cultural, mental and physical development of pupils at the school and of society"; a training in all their fields.

Autism and inclusion in education is a concept that today has undergone a qualitative development in pre-university education schools. The handbook extracted from (Save the Children, 2013) clearly outlines the procedures followed for the inclusion of students with special needs in schools from the aspects of legal framework to the individual assistant teacher work planning. Planning and organizing the school's procedures and strategies for the functioning and running the students' educational and social process, including inclusive education,

requires first of all the respect and implementation of the legal framework and then the other elements involved.

But what does inclusive school mean?

An inclusive school is one in which differences between students and diversity are welcomed and the necessary measures are taken to achieve it. When we emphasize difference between students we do not mean only students with disabilities, in our case of students with ASD, but all those who have differences or specifics in learning, such as students from the Roma community, low-income or gender-based students, etc.

In a general description of the treatment of students with special needs in schools and their inclusion with other students begins with the school-level planning phase of their inclusion. This planning includes procedures for registering students with special needs, procedures for identifying them, clarifying the roles and responsibilities of members of the pedagogical staff in relation to students with disabilities, etc. At the time of registering students with special needs or evaluating a student with special needs, an important role is played by the commission for assessing the condition of the student; it might be a paediatrician, psychologist, social worker, teacher. A special role in this process is also played by the assistant teacher who, in collaboration with other stakeholders, monitors the progress of the student with special needs.

Working with students with special needs, especially students with ASD, is a difficult process for the assistant teacher and it is impossible to perform it alone. The help he receives from a doctor, psychologist, social worker and even a parent is important as they provide him with the knowledge necessary for the following processes:

- Carrying out the student's diagnosis
- Drafting the Individual Education Plan
- Developing strategies and creating tools for achieving learning outcomes.

The assistant teacher uses all of these mentioned above in developing their progress reports according to the plan in which he sets out the main strategies, where it is based the work accomplished for the student's development in the four main areas of his / her development (communication (verbal / nonverbal), emotional, cognitive, and motor development).

3. Presentation of the case for study

Based on the theoretical issues presented in the first part of the study, we conclude that recognizing the diagnosis of students, especially those with autism, is a primary concern for the stakeholders involved in working for his development and inclusion with the rest of the class.

3.1. General description and overview of the initial state of the case study

In presenting the case study, we will base our case report on psychosocial assessment by presenting the initial state assessed by the commission.Student A is a 10-year old girl, a fifth-grade student diagnosed with pervasive developmental disorder /autism ASD by the psychosocial assessment commission at the age of 8, considering the employment of a teaching assistant for two years.Difficulties of the student in question are reflected in difficulties mainly to the acquisition of verbal and non-verbal elements of communication, social and emotional development, cognitive and motor development. With regard to verbal elements of communication it is difficult to understand the student while he articulates words as he articulates irregular words without tenses and intonations. He reacts when calling him by his name, understands simple messages but does not always respond, speaks about himself in the third person, and understands instructions related to manipulating a simple object.

On the other hand, he reacts to the affected person, understands the mimicry of a family member and understands the negative and affirmative signs. He generally maintains eye contact, does actions to look for an object, and points to objects he likes. Through mimicry he expresses emotions and spontaneously he also expresses emotions towards family members.Regarding socio-emotional development, the student shows interest in playing in the classroom although involved in an unstructured way.He does not show interest in strangers but interacts with unknown children, searches for school facilities with friends but often takes them without permission.

Emotionally, he laughs at a humorous situation, calls for attention to what he wants, and bursts of anger when others do not understand or meet his demands.In the cognitive approach the child is able to identify sounds and objects (the car, the door, the bell, the motorcycle etc.) and

can easily get oriented with familiar spaces (house, yard, neighbourhood, school etc.), is able to recognize the three main colours, to identify objects that are similar or different to each other, to understand the "tall-short" concept, to recognize only five letters of the alphabet (small letters or capital letters) but cannot recognize any handwriting letter. The child is also able to copy images/ letters after having observed them but he cannot write letters when you dictate them to him and is not able to copy sentences.

Regarding mathematical knowledge, the child hardly distinguishes numbers from 1 to 10. Regarding the motor skill, the child is able to hold the pencil, to use the scissors but he is not able to accurately cut shapes with scissors. He can exert pressure when writing and can colour accurately inside the colouring figures. The child is also able to walk and run, is able to go up and down the stairs without anyone's help, can dress himself and can manipulate the ball during a game.

All of the data mentioned above serve to the assistant teacher to set up the basic structures for the treatment of pupil's difficulties.

3.2. The strategy for the situation's improvement (techniques/tools)

As also treated on issue 2.2, based on the recognition of the nature of difficulties the pupil encounters, the assistant teacher in collaboration with the psychologist and the social worker design the main strategies for pupil's difficulties treatment. In treating this case, the commission of psycho-social evaluation of the pupil took into consideration all the components related to the characteristics of pupils to reflect for every area the strategies and the necessary tools needed for the improvement of difficulties.

The first step in strategy designing consists in highlighting the pupil's strengths that refer to the pupils' tendencies and their abilities to perceive in a different way. It should also be kept in mind that pupils with special needs often have tendencies in specific fields, especially in creative ones.

In this case, the assistant teacher was concentrated on pupil's strengths, grouping them according to the main developmental areas of the aspects below:

- **Communication** (the pupil is able to understand the messages given to him and can answer these messages; he reacts to touching

and shows the objects that he likes, he can understand the face mimic of a person familiar to him).

- **Social and emotional** (the kid expresses basic feelings, especially to empathy for people that support him and they get attached to the assistant teacher; he expresses interest and positive emotions during classroom games; easy tasks can be entrusted to him and he likes to engage)
- **Cognitive** (the pupil is curious and learns through observation, he is able to recognize and distinguish some letters and numbers, he recognizes the main colours, he can draw- but cannot make detailed drawings)
- **Motor learning** (the pupil uses hands and fingers for different manipulations; he uses the senses; he likes physical games and engages in games)

The strengths observed were used to create strategies, methods and tools which encourage the further development of the pupil. Based on these data the teacher predicted the implementation of the strategies, the concrete tools according to the four areas mentioned above, using them in the encouragement of pupil's strengths. With the tools and the techniques used was noticed an integrity of the elements that encourage the development of the aspects above.

- **"Continue according to the rule"** is a method used to introduce pupils to colours, shapes as well as with the rules of tasks accomplishment. The tools used for this method are colour papers, shapes, colours, plastic cups etc. In appliance of this method the pupil will colour and will put the objects plastic shapes in order. This method aims at improving the pupil's difficulties that are related with concentration, respecting the rules, classification of objects etc., mainly related with the cognitive aspect of development.
- "**Fine Motor Skill**" is a method used to encourage the development of the right actions of the coordination of eyes and hands and to make subtle actions. The tools used for this method are the toys, geometric shapes, bead, thread etc. Through the implementation of this method, the pupil will be encouraged to make correct physical movements for using tools by following the instructions of the assistant teacher.

- **"Mosaic** –Table" is a method used for the development of cognitive skills and motor skills to make pupils able to distinguish numbers, letter, summation of numbers etc. The tools used for this method are colour papers, colours, beads, tables etc. Through this method the kid is encouraged to form words, to do mathematical sums, to learn to distinguish colours.
- **"Fine matricity"** helps the kid gain skills that help him in self-care through the physical movements that stimulates the interaction with tools such as: zippers, different clothes, springs, buttons, straps etc. The implementation of this method aims at the encouragement of dressing self-autonomy and the physical movements of the human limbs.
- **"Colour as you wish"** helps the kid in the recognition of colours, concentration and the rest if he gets tired during the lesson. The most used tools are colours, colouring pages with illustrations, plasticise, thread etc.
- **"The pencil function**" helps the pupil learn how to hold tools such as pencils, coloured pencils, scissors, etc. and to create by interacting with them.
- **"The letters- our words"** helps the kid recognize and articulate words that start with the corresponding letters, aiming the enrichment of their vocabulary, the implementation of commands, the acquisition of words with opposite meaning.

4. Methodology of study

In a general description of the issues treated above, the whole process of working with children with ASD is based on three main pillars. First the teacher has to recognize the pupil's state of difficulty and through this recognition he has to point out the strengths –thus the aspects on which he will be based when working with these pupils and then he has to adapt or create strategies, tools, methods in help of the pupil's further progress.

In this study case the tools and methods envisioned for appliance try to encourage the pupil's development on the four main areas of development mentioned on the issues above. The study methodology used refers mainly to the teaching methods and tools for pupils with ASD.

The progress of the appliance of methods and tools was evaluated through the observation forms used during the whole time of the appliance of these methods and tools (during the school year 2017-2018 and 2018-2019).

The evaluation form includes the main evaluation elements starting with the period during which this study was conducted, setting the objectives and the area of difficulty of the development intended for improvement. It continues with the adaptation level of the pupil with the combined method even in duration, defining the level of the accomplishment of objectives and it is concluded with highlighting the effectiveness of the method/tool, the difficulties of its implementation and suggestions for possible adaptations. Interviews with the teacher of the class, psychologist and the parent of the child are also used to complete the whole evaluation procedure of the methods and tools. The evaluation of the methods/ tools from the assistant teacher will help this teacher for a successful teaching process with pupils with special needs.

a) The outcomes of the methods and tools used

From the data extracted from the evaluation forms of the methods/ tools used, generally the methods/tools used accomplish the objectives set in IEP (Individualized Education Program) trying to encourage the treatment of difficulties in the four main areas defined in the study.

The adaptation level of the pupils with the methods has resulted higher than average, needing more than 10 days to get used to these methods - this also as a result of the short period of time of the implementation (3 months).

- "**Continue according to the rule**" was evaluated regarding the adaptation level and it took a period longer than 10 days for the child to perceive it. The difficulties of the child in the implementation of this method were mainly related with the difficulty of the child to understand the simple order of the objects. The objectives of this method were accomplished on average and its effectiveness was evaluated on an average level by the teacher by suggesting its usage more often to help in the concentration of the child**.**
- "**Fine motor skill**" was evaluated higher than average regarding the adaptation level and it took the child a period of more

than 10 days to perceive it. The difficulties in the implementation of this method were mainly related with the difficulty of the child to form the puzzles. The objective of this aim were completely accomplished and its effectiveness was maximally evaluated by the teacher by suggesting the usage of puzzles more often.

- "**Mosaic- table**" was evaluated on average regarding the adaptation level and it took a period of more than 10 days for the child to perceive it. The difficulties in the appliance of this method were mainly related with the difficulties of the child to perceive the concepts "up- down" and to learn how to sum up numbers. The objectives of the method were completely accomplished regarding the acquisition of numbers up to 40 and minimally accomplished regarding the sums with numbers. Its effectiveness was evaluated on average by the teacher by suggesting to practice more often sums with numbers.

- **"Fine matricity"** was evaluated above the average level regarding the adaptation level and it took the child a period of more than 10 days to perceive it. The difficulties in the implementation of this method coincided with the ability to perform tiny movements. The objectives of this method were accomplished on average and its effectiveness was evaluated above the average by the teacher by suggesting the usage of actions with hands and different tools more often.

- **"Color as you wish"** was evaluated above the average level regarding the adaptation level and it took the child a period of 2-10 days to perceive it. There were no difficulties encountered in the implementation of this method since it was one of the most-liked methods from the child. The objectives of the method were completely accomplished and its effectiveness was maximally evaluated by the teacher by suggesting the usage of this method as a motivation tool to improve the other difficulties.

- **"The function of the pencil"** was evaluated above the average level of adaptation and it took the child a period of 2-10 days to perceive it. The difficulties in the implementation of this method were mainly related with the concentration of the child on the usage of the pencil and scissors. The objectives of this method were accomplished in different levels because the first and second objective were evaluated on average and maximally respectively

and the third objective was not accomplished and it consisted on the difficulty in the usage of scissors for different cuts. The teacher evaluates the effectiveness of this method above the average level and suggests the usage of this method more often especially in the accomplishment of its third objective.

- "**Letters- our words"** was evaluated on average regarding the adaptation level and it took the child a period of more than 10 days to perceive. The difficulties of the implementation of this method were mainly related with the difficulty the child encountered in taking commands and to communicate freely, especially in the first steps of the implementation of this method. The objectives of this method were accomplished on an average basis and its effectiveness was evaluated above the average level.

From all the methods or the tools used, most of them accomplished on an average level the objectives set in the beginning and only the "Fine Motor Skill" and the "Colour as you wish" method completely accomplished the objectives. During the implementation of these methods, the pupil was motivated to colour and interact with different tools.

Among the techniques used, there were also cases in which the pupil encountered difficulties. The methods "Mosaic-table" and "Continue according to the rule" are not completely accomplished because the pupil encountered difficulties in learning the orientation concepts "up –down", calculations with numbers and in the order or the simple classification of the objects.

The interview with the parent gave us important data related not only with the work of the assistant teacher with the pupil but also with the pupil's activity at home. The parent considers the implementation of these methods at home as necessary since the child feels motivated to work on different tasks after school and the result is reflected in the pupil's behaviour at home.

Conclusions next challenges

Working with pupils with special needs is a difficult process for teachers because it confronts them with different situations and it acquires a good scientific formation, as well as a formation in the practical aspects of the methods of teaching. The idea of this study

focuses on introducing a working model of the assistant teachers with pupils with special needs.

Besides the appliance of the demands of sub-legal acts, the teacher has to apply a diversity of tools and techniques in help of pupils' difficulties the improvement. To make this possible he gets familiar with the pupil, he must distinguish his strengths and the difficulties he has, his character and preferences. The teacher can conduct this process through observations, meetings with the psychologist, with the parent etc.

In this study case the methods and tools used had an effect on the development of pupils' difficulties but in this process emphasis should be put on the ways and manner the assistant teacher has to follow for the implementation of these methods (testing through the observation forms) as a way that adjusts their usage related with the pupil's needs. There are many challenges the assistant teacher faces while working with pupils with special needs, but the main challenge referring to this study as well, remains the usage of a diversity of methods and tools that draw pupils' attention and the extension of their appliance beyond the school environment by creating a consolidated Teacher- Parent-Psychologist collaboration.

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EUROPEAN UNION IN EDUCATION METHODS: A REVIEW OF THE CURRICULA OF "FAN S. NOLI" UNIVERSITY

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Abstract

The European path is one the most fundamental goals of Tirana's foreign policy in the post-Cold War period, and continues to remain as such up to now. Additionally, the main dimensions of E.U. nature and functioning are part of Albanian curriculum in the graduate and post-graduate studies.

The main aim of this article is the examination of Fan S. Noli University's curricula with regard to European Union courses. Therefore, some questions that arise out and are to be researched in the present paper are as follow: 1) How many E.U. courses do exist in the curricula of Fan S. Noli University and what topics do they cover? 2) Which educational methods have been applied to E.U. learning? 4) What kind of improvement may be promoted and achieved in E.U. curricula, in order to adapt the students with actual phenomena and challenges?

As far as the RAEM conference is organized by Fan S. Noli University (in Korçë, Albania), the present research has been conducted at this university. Describing European Union's nature and its dynamics will be fulfilled by analyzing in details the E.U. courses toughed in the mentioned university. By referring to E.U. theory, history, politics, and social dimensions, this paper may contribute further for the discussion–in Fan S. Noli University and widely–about the improvement of E.U.

curricula. This purpose is facilitated after the identification of strong and weak points, which will lead to respective suggestions.

Introduction

The European Union (E.U.) constitutes a crucial feature of domestic affairs of Albania since the end of the Cold War period up to this moment. Not only the E.U. is closely related to foreign policy, but it also shapes sectors of public policy, like law, economics, education, health, transports, agriculture, and further.Many countries of Europe witnessed a rice of E.U. courses in their respective higher education, as the process of European integration led to the creation of bachelor and master programs related to European and International Studies. (Farneti andVanhoonacker, 2014, p. 1, 2).Due to trends of Globalization and other changes of western societies – included the recent financial crisis in Europe and United States of America over the past decade–educational systems, and particularly the learning process of students, should be adapted to the new context of the labor market.(Gijselaers, et., 2014, p. 21-22).

European Union studiesmay imply a paradigm of this sort of adaption, due to the fact that E.U. studies cover a variety of employment fields where the graduate students may work, such as European institutions, or/andlegal, political and sociological fields in their country of origin (Bearfield, 2014, p. 27). This is becausethe multidisciplinary nature of E.U. studies composed by a wide range of disciplines, such as social science, economics, law, philosophy, sociology, art. (Gijselaers, et., 2014, p. 10, 13).

The central purpose of the presentpaper is the examination of E.U. courses in Albania, by focusing exclusively(as a case study) onthe curricula of Fan S. Noli University, and afterwards to offer suggestionswhichpotentially may improve and enrich E.U. curricula.Afteroutlining somebasic characteristics of European Union, like the nature of the E.U., its beginnings, the theory of European integration, Europeanlegislation and enlargement process, the welfare state, E.U. citizenship, the challenges facing the E.U. and its perspective, we will try to identify the weak points of Fan S. Noli University's curricula regarding E.U. studies, and suggest changes that

may be applied in the future. In this context, the present paper is a contribution to the broad discussion of the international conference 'RAEM 2019', concerning the transmission of knowledge in education, concretely the knowledge related to European Union studies.[1]

1. "Fan S. Noli University" curricula and E.U. courses

Being a lecturer of Fan S. University in Albania, and due to the fact that the RAEM conference is organized by this university, I will focus on the curricula of Fan S. Noli University. In total, there are eight E.U. courses that belongs to the four facultiesof the mentioned university, respectively: one in the Faculty of Agriculture; one in the Faculty of Economy; one in the Faculty of Education and Philology; and fivein the Faculty of Natural and Human Sciences. All courses are adapted to the nature of each faculty and its studies. Forinstance:1) 'E.U. politics on agriculture, food & rural areas' belongs to the Master of Professional Studies (M.P.S.) 'Integrated Rural Development'at the Faculty of Agriculture; 2) 'European Monetary System' belongs to the Master of Science (M.S.) 'Finance' at the Faculty of Economy; 3) while 'History of E.U.', as a bachelor course of the degree 'History-Geography' belongs to the Faculty of Education and Philology. On the other hand, the Faculty of Natural and Human Studies, as the biggest faculty of Fan S. Noli University, hosts five E.U. courses: specifically:4) 'Social politics of E.U' in the bachelor degree 'Administration and social politics' and 5) in the M.S. degree 'Social philosophy';6) 'Social dimension of the E.U. and European integration'in the M.P.S. degree 'Public administration'; 7) 'E.U. and its politics' in the M.P.S. degree 'Teacher of Secondary Education in Social Sciences', and finally 8) 'Social politics of the E.U.' in the professional degree 'Social service'.[2]

This sort of rigid proportionality of E.U. courses with the narrow nature and physiognomy of program studies, departments, or more generally faculties, deprives from the student the ability to become familiar with European Unionin its overall context, in details, and gradually. To be

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[1] For more information about the RAEM conference, see its official webpage http://raemuniko.com/home/ (Access on August 20, 2020).

[2] For more about the curricula of Fan S. Noli University, see the directory 'Study programs' on its official webpage https://www.unkorce.edu.al/en/study-programs (access on August 25, 2020).

clearer, a student of agriculture or social sciences needs to firstly know what European Union means, theoretically and practically, in order to continue later with the specific knowledge that fits to the program of study where followed by the student. The absence of continuity in learning concerning European Union, leads to a superficial knowledge, which is also isolated by potential extensions on actual developments and critical thinking.[3]

Let us describe all the E.U. courses of Fan S. Noli University, starting from 'History of the E.U.' with 5 ECTS credits. It covers the historical evolution of European Union and deals with topics, such as political discussion on European cooperation during the period between the two World Wars, Marshal Plan, and Cold War European dynamics. On the other hand, this course does not focus exclusively on the historical dimension, while political process is also described with details in its syllabus. To be more concrete, when the course ends, students must be able to acquire geopolitical and economic notions of the E.U., while are invited to understand and interpret subjects, such as Single European Currency (Euro) orEuro-American relations.The bibliography where this course is based is that of the well-known professor of European integration, Desmond Dinan: 1) Historia e IntegrimitEuropian I (2010);and 2) Politikat e BashkimitEuropian II (2010), both translated in Albanian language by Julia Çela and published in 2010.[4]

E.U. politics on agriculture, food & rural areas', course with 4 ECTS credits, seems to be more problematic,while it does not cover any topic that relates directly with the very nature of this course. On the contrary, it deals with economic theory ordomestic agricultural issues of Albania, instead of treating the common agricultural policy of

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[3] In a pilot research with students of Fan S. Noli University in 2017, the results of which are expected to get published soon at conference proceedings of the 4th International Conference 'Education Across Borders. Education in the 21st Century: Challenges and Perspectives', organized by the University of West Macedonia in Florina, Greece (2018), the questioned students faced limited knowledge about the basic nature of European Union and its symbols. Jordan Jorgji&DalinaJashari "Albanian public opinion on European Union: a pilot research study in the region of Korça." *The proceedings of the 4th International Conference "Education Across Borders. Education in the 21st Century: Challenges and Perspectives*, forthcoming.
[4]For more about both cited books, as well as for other works detailed in the text below, see the respective bibliographical references in the end of this paper.

European Union(C.A.P.) and the subsidies paid to farmers by the E.U.Where it comes to the international dimension of economy and agriculture, the syllabus includes lectures and seminars that concern international institutions and agreements, such as International Monetary Fund (I.M.F.), World Bank (W.B.) or the General Agreement on Tariffs and Trade (G.A.T.T.). The compulsory literature of this is based on the text of the Albanian professor of Horticulture, Engjell Shkreli *Politikat e bujqësisë dhe të ushqimit* (The politics of agriculture and food), while it is also referred, as supplementary literature, the article of Ulrich Koester (2003), 'The Common Agricultural Policy' in. El-Agraa (ed.), The European Union. Economics and Policies. Seventh Edition.

Similarly to the two courses described above, 'European Monetary System'is also compulsory andhas 6 ECTS credits.Its main aim isthe studying of the role that European monetary integration has on the member countries' financial systems, and more broadly, on the economy of the candidates for membership inthe European Union.

After explaining the institutional, political and social structure of the E.U.– which are all summarized in threedifferent chapters – the course in its great part relies ontheory and practice of European economic integration. Such lectures and seminars are based onunification of E.U. market,development of European monetary system and its instruments, economic progress and exchange rates,financial and monetary integration in the European Union,financial regulations and financial stability, andEuropean Central Bank. The compulsory literature students must follow with regard to 'European Monetary System' course is composed by three academic texts: concretely, 1) Jonathan Olsen, and John McCormic (2016), *The European Union. Politics and Policies*; 2) Jakob de Haan, and Helge Berger (2010), eds., *The European Central Bank at Ten*;and 3) Georges Ugeux (2014), *International Finance Regulation: The Quest for Financial Stability*.

The other fiveE.U. courses are taught at the Faculty of Natural and Human Sciences, by the staff of the department of Social Sciences. The course 'Social politics of the E.U.' is compulsory in the bachelor degree 'Administration and social politics' and has 7 ETCS credits. It is composed by 15 lectures and seminars, dealing with the social dimension ofEuropean Union. More concretely, various social politics are discussed in auditorium, such as education and vocational training,

employment, improvement of working and living conditions, family policy, gender inequality, people with disabilities and older people, poverty and social exclusion, educational and labor mobility. Students become familiar with social politics after they undergo a careful introduction of historical and institutional dimension of European Union. They learn about how E.U. was established, about treaties, institutions, the decision-making process, aboutthe Europeanenlargement and integration, as well as they might assimilate key notions, such as harmonization, subsidiarity, mutual defense clause, European Citizens' Initiative. The main literature where this course is based is the book of Linda Hantrais (edition of 1995 andthe new edition of 2007) *Social Policy in the European Union.*

TwoE.U. courses taught in the Master level, both compulsory, are 'Social dimension of the E.U. and European integration'of 3 ETCS credits and 'Social politics of E.U' with 6 ETCS credits. Besides the basic knowledge given on institutional and social dimensions of European Union and its politics, the two courses shed particular light on political, economic and social discussion of the today democracy; while seriously take into account the meeting points with actual and future challenges facing the E.U. An illuminative book where the discussion is based on is the collective work of six scholars of different nationality (Kostas Vergopoulos, Michel Husson, Yves Salesse, Catherine Samary and JérômeValluy), edited by the Greek scholar, Stavros Tompazos (2008).

To be more concrete, the cornerstone of the discussion about democracy is focused on the dynamic relation between democracy, European integration and cohesion, on the one hand, and various social challenges, on the other, such as unemployment, flexibility of labor laws, migration, decision-making process, economic inequalities, marginalization of east and south Europe, globalization, decay of democracy. In this way, students are invited to cultivate critical thinking concerningthe process of European integration and social policy, by identifyinggaps and offering alternative approaches. Additionally, students become familiar with the process of membership of Albania to the E.U., while are being motivated to consider the impact of Albania's Europeanization and the necessary steps the mentioned country must undertake in the future. On Albania and European Union,

the course is based on the work of MirelaBogdani and John Loughlin, (2007), *Albania and the European Union.*

E.U. and its politicsis also compulsory and has 4 ETCS credits. It aims to explain the institutional structure of European Union – including the relation of European institutions with the member-states – and to describe the politics applied by the E.U. Judging by the lectures and seminars in the respective syllabus, the course sheds light on the basic E.U. politics, such as competition and industrial policy, foreign policy, social policy, regional policy, as well as on theoretical models that help at explaining European integration (i.e. functionalism, intergovernmentalism, critical theories). The main literature of this course is derived from the work of François d'Arcy (2007), *Politikat e Bashkimit Evropian* (The politics of European Union),and on Dinan's book, *Politikat e BashkimitEvropian,* referred above.

The last course to be mentioned is 'Social politics of the E.U.', a compulsory course of 5 ETCS credits applies to the students of the professional degree 'Social Service'. Given the professional (not academic) level of this degree, students become familiar with the basic concepts of European Union, such as European symbols, identity, culture of solidarity and tolerance,European integration. Additionally, they learn more about the main social politics applied by the E.U. and the member-states, while expressing their constructive thoughts aboutthe impact of European Union on Albania's social conditions, as a country thataspirate to become a E.U. member. As a main literature, it does serve the book of Pierre Pestieau (2006), *The Welfare State in the European Union. Economic and Social Perspectives.*

2. Teaching methods and participation of students

All the aforementioned courses are built on lectures, seminars and student papers, in a relation that is also reflected on the assessment of students. To be more concrete, seminars and student papers constitute 30% of the total assessment, while final exam has a greater importance, equal to 70% of the evaluation.

Besides the traditional learning, simulations are also used. The purpose is to apply more innovative methods and motivate further the participation of students in teaching the E.U. courses. By this form of experimental learning, students have the opportunity to experience in reality the acquired knowledge. Such an event was organized with

students of 'Administration and social politics' degree in May 2017, in the context of their course 'Social politics of the E.U.' In presence of the professor in charge and the faculty's authorities, studentsshowed their performance in presenting the social dimension of the European Union, wherea group of two to three students explained in details what and how social politics are applied by the E.U. Consequently, the auditorium, mainly composed by students, was transformed into an interactive environment of debate, withquestions and analysis raised by the participants. The event was organized on May 9th, with the occasion of the 'Day of European Union'.[5] Another similar activity has been promoted by the Department of History-Geography in the context of the course 'History of the E.U.', an activity named 'Europe in the eyes of students', taken place during the dates 13 and 14 May, 2019.[6]

An alternative and innovative method applied by Fan S. University – particularly by the Department of Social Sciences –is the projection of documenters and movies that focus on the very nature of Europe and its challenges. By this method, students are encouraged to become part of thematic under discussion and offer alternative solution about international developments and the future of Europe. Such topics are derived by the BBC documentary series 'People's century', and various movies, like 'Desert Flower' (2009) and 'The Two Popes'.[7]

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[5] For more detailed information about this event, see the respective link on the web of Fan S. Noli University http://www.unkorce.edu.al/sq/content/forumi-i-debatit-pran%C3%AB-fakultetit-t%C3%AB-shkencave-t%C3%AB-natyr%C3%ABs-dhe-shkencave-humane-ka-zhvilluar?page=7, as well as the local media TV Korça, respectively on the link
https://www.youtube.com/watch?v=TnY689EQ8RA&t=82s. (Access on August 26, 2020)

[6] For more about this event see the detailed information on the link of Fan S. Noli University https://www.unkorce.edu.al/sq/content/evropa-n%C3%AB-syt%C3%AB-e-student%C3%ABve-veprimtari-e-organizuar-nga-departamenti-i-histori-gjeografis%C3%AB. (Access on August 26, 2020)

[7] The BBC documentary series and the mentioned movies are a personal collection of original DVD, owned by the author of this paper. The BBC documentary series are also available on YouTube
https://www.youtube.com/playlist?list=PLuL26fXZ8eTNLLnugg2BTyOZQ7HT-QZk4. (Access on August 27, 2020)

Conclusion: problems and suggestions

As other phenomena under studying, the E.U. curriculum of Fan S. Noli University has its strong and weak points. Given the fact that the mentioned university is relatively new (established in 1992), its E.U. courses covers the fundamental columns of European Union and its politics, started from the historical background of the E.U. to the common and consolidated politics applies by the Union. Anotherstrong point is the close cycle of studiesof E.U. courses and the diversity by which these courses are taught to different degrees and faculties within the Fan S. Noli University. As we found out in thispaper, the E.U. courses do operate in Professional, Bachelor and Master Degrees, over all the constituent faculties of the university. Additionally, it might be stressed out that the E.U. courses, eight in total, constitute all together a number of 40 ETCS credits.

As far as to the weak points, it might be given more attention, due to thepossibility we have in offering suggestions and improve the E.U. curricula. Concretely, judging by the information analyzed above, we have reached to some suggestions, as are referred below:

First, courses with elementary knowledge about European Union, its history, European idea and culture, must be added to the curricula of Fan S. Noli University.By these courses, students would be helped to gradually construct their general understanding on the E.U., before passing to a more specialized apprehension in a later phase.A higher level of E.U. studies may be the theoretical approaches of European Union or/andthe detailed examination of social politics and challenges with regard to actual international dynamics. This may contribute further to strengthen the critical thinking of students.

Second, a more careful distribution of E.U. courses might be carried out to the programs of Fan S. Noli University, by adapting the elementary knowledge to professional and bachelor degrees, on the one hand, and the more detailed and critical thinking to the last years of bachelor and master degrees, on the other hand.

Third, all E.U. courses may be unified and integrated to a single research center on E.U. studies within Fan S. Noli University. This would help the operation of E.U. courses, in independent way from the university's bureaucracy, and also by cooperating with domestic and foreign actors specialized to European and International Studies.

Fourth, the transmission of knowledge may be more efficient and complete if simulations of E.U. and social politics are applying more often. Consequently, the relation between lecturer and students become more interactive.

Five, but not last, innovative courses may be added to the university curricula, in order to reflecting the actual tendencies of Europe and world. Such courses may focus on European law, the protection of environment and human rights, as well ason the identity of European citizens in the 21st century.

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THE CHALLENGES OF ADAPTING THE SYNTACTIC CONSTRUCTIONS TO THE TRANSLATION OF THE POEMS OF CHARLES BAUDELAIRE

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Abstract

The translation of poetry has always been a problem and is considered difficult, as it includes a number of language and extraneous factors that make it difficult. Our paper approaches to the translating process of the poetry volume "*The Flowers of Evil*" by Charles Baudelaire focusing on linguistic and syntactic literary translation. Studies done so far in Albania have focused mostly on the literary aspects of the poems, addressing its stylistic and artistic views. Thus, through this paper we thought to treat the language of the poems, concretely the syntactic challenges of their translation. This paper is conceived as a study of theoretical and practical character in the field of Translation Studies. Through translation theories and translation process strategies as well as grammar and syntax manuals, our study sheds light on the translation of Charles Baudelaire's "*The Flowers of Evil*" work by basing research and comparative analysis on the theories and views of theorists, researchers and syntaxists such as: Peter Newmark, Umberto Eco, EdmodTupe, ÉmileBenveniste, André Lefevere, F. de Saussure, etc.

Keywords: Challenge, translation, poetry, syntax, comparative analysis.

1. Introduction

This paper deals with the linguistic and comparative analysis of the dynamics of the translation of Baudelaire's poetry and in particular, the challenges of syntax adaptations from French into Albanian, which in our judgmentwe lose most from. The selection of this author and his poetic volume *"The Flowers of Evil"* has been made for several reasons. The first cause consists in the fact that Charles Baudelaire is one of the most important authors of modernism and in Albania the studies around this author and his work are minimal. The other reason relates to the

issue of translation of the poetic volume taken into consideration, where during the many reviews we have encountered loss and major changes of the work not only in linguistic aspects, which is our objective but also in the styles, metric, etc. Another cause that influenced the selection of this author, is his very special language, especially the syntax of his verse, which poses a separate challenge to be translated into another language, specifically in Albanian. Our study focuses on the process of translating Baudelaire's poems, examined in linguistic and mostly syntactic aspects, as well as presenting contrasts of linguistic and syntax losses during the translation into Albanian by two different translators, based on the syntax of sentence and related matters.

2. Methodology
For the realization of this paper, two methods will be used:
1. Descriptive method - for the study of relevant theoretical literature.
2. Analytical-comparative method for analysis of language corpus.
Through the descriptive method we have made an analysis of literary translation mainly of translating poetry, translation tradition, translation issues and thetranslation problems over the years.
Meanwhile, through the analytical-comparative method, the syntax of the sentence between the two languages is compared and the relevant issues in the grammar of this part. Also through this method the original text in French is compared with the Albanian variants. Based on this approach, the paper highlights the differences between the two language codes, the syntax of the two languages, as well as the differences and losses we have in the translation variants of poetry and in the construction of verses. So, we notice the challenges the translator has in the syntax constructions adaptations, as we have to abide two very different linguistic codes. By working with these two methods, our objectives will be easily achieved.

3. A general overview of poetic translation. Historical-literary background of French poet creativity Charles Baudelaire; the translation issue of his poetry

3.1 Translation of poetry - challenge for the translator

Researcher E. Nida in his work "*Towards a Science of Translation*" describes translation as an extremely complex process, making it difficult to build a unitary translation theory. By making a comparison with other literary genders, the translation of poetry is considered to be the most difficult and there may be a lot of discussions about potential changes to the original. According to AurelPlasari: "*at the beginning of any remorse for a translation story, researches scholars are usually forced to distinguish between translation, adaptation and editing*"[1]. So the reasoning of this issue is that, it is impossible to pass all the factors and features of the original in the translation variant. The translation carries an early origin. Among the old translation proofs is the return of the Bible from ancient Hebrew to ancient Greek. Since Greek-Roman antiquity, there have been opinions on theories and issues related to translation. The art of translation, according to Horace and Cicero, is about the interpretation of the text in order to create a new version: "*Non verbum de verbo, sedsensum de sensu*[2]" (not the word, but the meaning). Further, the translation has undergone changes and improvements in quality from the epoch to the present day, but essentially preserving the theories and principles of the forerunners.

Translation of poetry has been considered the most difficult and has been the subject of extensive discussion, especially in the field of literary translation. Most of the discussions consist of theoretical translation issues, where we have different views. Although it is extremely important that the features of the original text should be highlighted, another translation criterion is the preservation of the poetic values of translated text.

According to Frost, "*the main feature of poetic discourse that distinguishes it from ordinary discourse is that form cannot be separated from poetic content".[3]*Content is fundamentally related to language and that is what makes translating poetry more difficult than any other type of translation. Furthermore, Jacobson in "*Linguistics and Poetics*" claims that: *"Poetry is untranslatable and it can only be recreated alienated".* So, the translator of poetry should aim for

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[1]Plasari, A. Tetor 1990,"Letërsia dhe Muret".Tiranë.Shkrimtari dhe Koha,Fq.189.
[2]Tufa, A.Shkurt 2008,"Mistika e origjinalit",Tiranë (tezë doktorature)Fq.46.
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accuracy and this makes the translator's dexterity difficult. Another researcher André Lefevere[4] lists some techniques around the translation, which can be used when we translate something. We need to clarify that translating poetry does not mean that all aspects of poetry are translated into practice, because each language has its own lexical, linguistic and structural pattern that differs from another language. The interpreter should have sufficient knowledge of the syntax functions of both languages and he should know the characteristics of each language well. During the translation we have difficulty, because the syntax of each language has its own changes, the way of building sentences, words and sentence reports, etc., all carry their different features from language to language, but approximating with the original is not impossible, as we have many successful translations.

3.2 Charles Baudelaire's poetry - translation context

To understand the style and creative process of Charles Baudelaire, who is one of the greatest French literary writers, the social, historical and economic conditions of the country should be recognized at the time when the writer has started his literary work.

Charles Baudelaire was born in Paris on 9 April 1821 and died on 31 August, 1867. In different biographies it is noted that he had a very difficult life. During his life and passion for the Beauty, he was constantly divided into two, between ecstasy and the horror of life and of human existence. Charles Baudelaire left behind, the collection "*The Flowers of Evil*", which is one of the most prominent collections of French poetry.

Ch. Baudelaire is distinguished for his language, specifically for his special syntax, which makes it even more difficult to translate his work into another language. Arthur Rimbaud saw Baudelaire as an "*alchemist of the word*" who by its power was able to turn the "*mud into gold*". Baudelaire's language is original and has come as an innovation in French literature, andis a language of evocation, comparison and correspondence. His work has been translated into several languages around the world, while in Albanian we have translated only the volume "*The Flowers of Evil"*. The aforementioned volume is one of his translated works, which also recognizes some

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[4]Lefevere, A. (1975) "Translating poetry": Seven strategies and a blueprint.Amsterdam- Assen: Van Gorcum,fq.20

variants. There are some different variants of the volume in the Albanian language (MensurRaifi, Anton Papleka, DritanThomallari, etc.), and in English, this volume recognizes about 20 variants from different translators.

Regarding the translation context of his poetry, we see that in the moments of translation she loses and changes a lot. Eco in the book, "*Saying almost the same thing*", presents a typical example of this case. He takes the case of poetry "*Les chats*" by Baudelaire, which is not translated by an automatic translator, but by a real translator, such as Mario Bonfantini. Significant variations have occurred in the content field, because, for example the word "*focolare"* has narrowed the semantic spectrum of the word "*maison,"* which is wider than that of the word used by Bonfantini. So, the translator has decided that, in addition to the content of the French text, the main effect or goal to be respected was the poetic one and over there he played everything.

Refer to a poem of this author translated in Albanian (a comparison of the degree of change made by us). From the comparative analysis of Baudelaire's poem "*The Albatross*" and variants in the Albanian language, there is a noticeable difference between the original and the variants in Albanian. In poetry, the definition of *"L'homme d'ekuipage*[5]*"* is a sophistication to define sailors. This used form generalizes the perpetrators of action and involves humanity.

In Albanian language this word has not come, because this word is simply translated "sailors" into all translations, not giving the word Baudelaire's connotation in the original. In essence, this word is written by the author himself to make it comprehensible, because it could only be used "*l'ekuipage*", but the fact that *"l'homme*" preavailing makes it more general. From the comparisons made, we see that the degree of change is major at the semantic, metric, but also syntactic level due to the apparent differences between the syntax of the two languages.

4. Approach of sentences constructions betweenthe Albanian and French language

This second part of our study aims to present the syntax of the sentence of both languages, Albanian and French languages, the key issues related to the syntax, also the main differences between the languages

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[5] "The men of a crew"- is translated by W. Aggeler, 1954. "The flowers of Evil, Fresno, CA: Academy Library Guild.

in this aspect. The syntactic comparison helps to better understand the difficulty of translating work from French to Albanian.

As stated above, we will consider the most fundamental issues of sentence constructs.

The sentence in both Albanian and French has known concepts and theories from different authors of linguistic scholars, but what is worth mentioning is the fact that these definitions in both languages do not carry any substantial changes in the content. Again, the sentence remains the fundamental unit of the syntax, which carries its grammatical and schematic side.

Every language has its own rules to list words in sentences and between the Albanian and the French as a neo-latin language there are visible differences. In Albanian grammar, the order of sentences in a period, as in a simple sentence, is relatively inexpensive: "*The limbs of the sentence can be placed in different places without changing their syntax function*[6]." Meanwhile, any concrete placement in a given sentence is conditioned by the importance they have in that sentence, by their expressive weight and emotional expression. The French language as well as the other neo-latin languages (Albanian, Spanish) tends to an embedded order of words in a sentence, of the type of the subject-predicate-object. Why is this happening? Because, in languages with simplified morphology, the syntax functions are mainlydetermined by the position of the words in the sentence.

There are also other changes that are related to the questionnaire. Regarding the construction of the questionnaire, what constitutes the essential distinction is the fact that in the French language the question is always expressed with a verb in narrative or conditional mode and never in conjunction.

Translation difficulties are also the special constructions we encounter in the French language. French as any other language has special constructions, which we do not encounter in other languages and become evident in translation moments, when translators encounter difficulties and phrases change, or phrase elements remain untranslated.

There are some words that accompany each phrase in French, which are almost never used in Albanian. Words such as *"ce / c'est and il y a"* are the most commonly used French phrases, which are used in all

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[6]Akademia e shkencave.2002, "*Gjuhashqipe 2*", Tiranë, f. 508.

sentences and periods, as in the beginning, but in many cases even in the middle of the sentence.

5. Comparative analysis between the original and the variants of the Albanian language

5.1. Translation and the change of the subject

When translating a piece from the original language into the other, one thing necessarily changes, such as meaning, grammar, content, stylistic, etc. These changes are primarily due to the adaptation of the languages. Languages differ from each other, especially in the grammatical and syntax aspects, which is our goal in this paper, which often because of the content of a verse, string, or phrase this can change. Below we will see how the translation of the word constitutesa change in the variants in Albanian, since the languages have differences in this aspect.

Unlike French, the order of limbs in sentences in Albanian is not generally embedded. There is a common order: *subject + predicate + object + context*[7]. But it can change without substantially altering syntax reports, most of the time with changes in syntax and stylistic coloration. In the original version, we notice that the sentences (verses, because we are dealing with poetry), they do not have this looseness, where the sentence can begin without a subject. It requires either a subject, which can be expressed in different forms, or a sentence that starts with a subset.

Here are some examples of the original and variants in Albanian to illustrate this idea:

Table 1. Translation and the change of the subject

Ch. Baudelaire	M. Raifi	D. Thomollari
Le lavire glissant sur less goufres amers. (*L'abatross*", fq. 16)	Mbi anije që sipër greminave të njelmta shket.("*Albatrosi*" fq. 10).	Përmesthellësivetëhidhuratë detrave. ("*Albatrosi*",fq. 24)

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[7] Akademia e shkencave të Shqipërisë,2002.
Institutiigjuhësisëdheletërsisë."Gramatika e gjuhësshqipe 2", ,Tiranë, f.72.

Puget, mélancolique empereur des forçats. (*"Les phares"*, fq. 20)	I dobët, Pyzhe, mbret melankolik i robërve. (*"Faret"*, fq. 14)	**Puzhe, itëdetyruarvesovranimelankolik. ("Fanarët", fq. 28)**
Ma pauvre muse, hélas qu'as-tudonccematin? (*"La muse malade"*, fq. 21)	Ç'kemojMuzë e gjorënëkëtëmëngjesveror? (*"Muza e sëmurë"*, fq. 16)	Medet, muzaime e shkretë! Kymëngjespotëmundon? (*"Muza e sëmurë"*, fq. 29
Je respire l'odeur de ton sein chaleureux, Je vois se dérouler des rivales heureux. (*"Parfum exotique"*, fq. 33)	Dhe erë e gjive t'tum'kaplon me ngroht'si, Më dalin para sysh brigje e fatlumni. (*"Erë ekzotike"*, fq. 25)	Symbyllur, në ngrohtësinë e një nate vjeshte, Shoh para meje plazhe të lumtur, çmendurisht të fekur. (*"Parfum ekzotik"*, fq. 41)

As we see in the examples above, the subject changes, or it does not translate at all, or simply the sentence starts with the relevant predicate, what makes the subject meaningful and of course for Albanian, is a regular syntax. So, the translator of poetry should aim for accuracy and this makes it very difficult the dexterity of translator expression. Significant changes can be observed even within the variants in Albanian of different authors. This proves that the translator is aiming

to convey a sense of poetry, but also to give it an effect, which is also felt by the reader, and is able to make conscious changes.

5.2 Displacement of the order of words

The piece we are relying on is a volume of poetry, and as is well known, poetry has a special language that we can often encounter irregularly constructed syntax, for reasons of rhyme, metrics, and other effects that carries a poem. In the case of this poet and in many of his poems we have a fixed order, as defined in French grammar, an order which in the Albanian variants causes the verse to undergo changes, sometimes too profound, affecting even in itself, the meaning of the poem. The causes are clear because we have mentioned that French as a neo-latin language has a fixed order and that a correct sentence must be constructed according to that established order. Whereas when that sentence behaves in another language, in our case in Albanian, there are differences and mismatches of the meanings.

Comparative table below will present these changes:

Table 2. Displacement of the order of words

Ch. Baudelaire	M. Raifi	D. Thomollari
Je vois ma femme en esprit. Son regard, Comme le tien, aimable béte. (”*Le chat*”, fq. 43)	Më bëhet se e shoh gruan time. Shikimi i saj si i yti është, kafshë e afrueshme. (”*Maca”,* fq. 34)	Të dashurën shoh në shpirt. Shikimi i saj më ngjan, Si i yti, kafshë e dashur dhe e qetë. (”*Macja*”, fq. 52)
Les soirs illuminés par l'ardeur du charbon, Et les soirs au balcon, voilés de vapeur roses. (*”Le balcon*”, fq. 44)	Kur mbrëmjet i ndriçonim me zjarr e prush karboni Sa i ëmbël qe gjiri yt! Sa e mirë zemra jote! (*”Balkoni”,* fq. 35)	E ato ndër ballkone, mbuluar me vello avujsh trëndafili, kur m'ishiëmbëlgjoksiyt! Zemrajotetërëmirësi! (”*Ballkoni*”, fq. 52)
Nous mettrons notre orgueil à	Me kreni do të këndojmë lavde	Krenaria jonë i gjunjëzohet duke i

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chanter ses louanges! (”*Tout entiere”,* fq. 52)	adhurimi. (”*Ajo e tëra”,* fq. 41)	thurrur lavdi. (”*Një e tërë”,* fq. 59)

From the examples we found that the order of words from the original language to Albanian differs, even in the translation variants in many cases, words are added to make the verse more understandable to the reader, words that are not in the original. In some of the aforementioned examples from a defined structure of the type: Subject-predicative-object, in translations into Albanian this sequence is either reversed, or there are verses that start directly with the verb, with the object or other second limbs of the Albanian language. These instances of such embedded constructions often become a challenge for the interpreter because their behavior in another language is too difficult, especially difficult to maintain the meaning of the verse, but also the whole contents of a certain poetry. Nida asserts: *"that translation is closely related to the problem of language, meaning, and equivalence"*. (Nida, A. 1964). Interpreters that have faced such challenges, in most cases have removed, or added a shifted word, when compared to certain expressions of the original.

5.3. Loss / change of grammatically unrelated words in verse
In addition to the limbs, the main and the second of the sentence, in the composition of this include other words or phrases. Such words and phrases come up with different constructions, with functional values and changed features. In the syntax they are distinguished:
a. Interjections
b. *Word or intermediate phrases*[8]
The reason we chose grammatically unrelated words in sentences, in our case in the verse, is because these kinds of words have a significant role in poetry, as in the construction of the verse, also carry a certain stylistic role, rhyme, metric, etc. Umberto Eco in the translation book "Tëthuashgatitënjëjtëngjë" emphasizes that: *"Salience of the nonlinguistic substance is key to the lecture with a poetic function"*. (Eco, 2006). Poetry is not just a word or just a metric. It is speech

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[8] Akademia e shkencave të Shqipërisë,2002.
Institutiigjuhësisëdheletërsisë."Gramatika e gjuhësshqipe 2", , Tiranë, fq.356

music. Another reason is because of the original and the variants in Albanian we will present exactly the losses and the changes that have been made to these words, which in our opinion are a separate challenge for the interpreter, these types of words often suffer the losses, the most commonvariations in the processes of translation. Each of the types in themselves holds different traits and has its own unique role in a sentence. In the following comparative table between speech types, which affect heavily in poetry, the into national effects that give it, express feelings, reactions, feelings being unconnected syntactically with the other limbs of the verse.

5.3.1 Interjections

Table 3. Translation of interjections

Ch. Baudelaire	M. Raifi	D. Thomollari
Ah!que n'ai-je mis bas tout un noeud de vipéres. (*"Benediction"*,fq. 2	Pse nuk solla një bylyk gjarpërinj, punë-futë. (*"Bekimi",* fq. 7)	**Ah**, një droçkë nepërkash si nuk linda më mirë. (*"Bekim"*, fq.21)
Dis-le, belle sorciére, **oh**! Dis, si tu le sais. (*"L'irreparable",* fq. 64)	Untranslated poetry	Engjëll plot shëndet, ethet e t'lënguarve a injeh. (*"Prapsueshmëri"*, fq. 60)

5.3.2 Word or intermediate phrases

Table 4. Translation of word or intermediate phrases

Ch. Baudelaire	M. Raifi	D. Thomollari
Demain, aprés-demain et toujours!-**comme nous.** (*"Le masque*", fq. 31)	Si për në, për të gjithë, si nesër e pasnesër. (*"Maska",* fq. 24)	Nesër, pasnesër e përgjithmonë! **-njësoj si ne**. (*"Maska*", fq. 39)
Toujours, **toujours en vrain**, l'etre aux ailes de gaze!	Untranslated poetry	Engjëll plot lumturi, plot gaz e plot dritë? (*"Prapsueshmëri"*, fq. 61)

("*L'irreparable*", fq. 66)		

5.4 The phenomenon of homogeneity as a challenge for the interpreter

In the grammar of the Albanian language, but also in French too, the phenomenon of homogeneity is defined as such: "*Homogeneous limbs are called limbs that fulfill the same syntactic functions, are in the same relationships with the same limb and in meaningful coordination relationships between them, united with asynchronous and coordinating links."*[9]One of the more common issues that we will be dealing with and for good reason are, firstly because the author we have chosen is distinguished for his intense use of homogeneous limbs in his poetry, which in a poem necessarily carry a stylistic and emotional function.

Secondly, we think that an interpreter faces difficulties. To have homogeneity, words must be in equality used and have the same syntax functions. Thus, the translation of these limbs becomes a challenge, because the translators in most cases do not convey this phenomenon in their variants, and also despite the fact that we may have one word after the other, they are not homogeneous to one another. Thesechanges and losses mostly affect poetry, especially this author, I emphasize this fact because Baudelaire is distinguished for a very special syntax, so his poetry has suffered profound losses in Albanian translations. We must also say that we have various changes from the variant to the variant, not just between the variants and the original.

The following table will show this phenomenon and the changes that it is experiencing.

Table 5. Translation of the homogeneous limbs

Ch. Baudelaire	M. Raifi	D. Thomollari
O serments, o parfums, o baisers infinis! ("*Le balcon*", fq. 45)	O betime, erëra, të puthura t'paskaj! (*"Balkoni"*, fq. 36)	O premtime, o parfume, o lumë puthjesh i

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[9] Akademia e shkencave të Shqipërisë,2002.
Institutiigjuhësisëdheletërsisë."Gramatika e gjuhësshqipe 2", ,Tiranë, fq. 298

		pashteruar! (*"Ballkoni", fq. 53*)
La sottise, l'erreur, le péché, la lésine. ("*Au lecteur*", fq. 1	Mëkati, mashtrimi dhe koprracia e ndyrë. ("*Lexuesit*", fq. 5)	Budallallëku dhe kurnacëria, mëkati dhe gabimi. ("*Lexuesit",* fq. 19)
Ses parfums, ses chansons et ses doces chaleurs! ("*Correspondances*", fq. 18	Parfumet, këngët dhe ngrohtësinë ëmbëlake! ("*Korrespondimet*", fq. 13)	Parfumet e saj, këngët dhe të ëmblën ngrohtësi. ("*Korrespondenca",* fq. 27*)*

In the examples above, we see changes not only between the variants and the original, but also with the variants of each other, these changes affect the structure of poetry, (some words or verses are not translated at all), but also in its content and meaning. The phenomena of homogeneity is sometimes achieved in translations into Albanian and sometimes not. This is because words often change from language to language, so the connotation of the word, causes this phenomenon to have difficulty translating it into another language.

5.5 The total losses that have occurred in poetry
As the term itself suggests, total losses refer to the loss of language source code texts and show that parts of the original text are removed and create difficulties in connecting to the whole of the other parts of the work in order to have coherence. These losses relate to verbal figurative signs and expressions that are closely related to culture. In this regard, they are unique to the source text and consequently have no equivalence in the translation culture. We think that complete losses during the translation of literary works occur for two main reasons: the cultural distance between the two languages, and as we have mentioned in the above chapters, less similarities between the two languages make the transmission of ideas linguistically and culturally more difficult. The other reason may be the incomplete knowledge of the interpreter on cultural issues of source language. Thus, we notice these losses in

idioms, proverbs, or in those untranslated parts that have cultural content in their content and constitute a meaning for the work as a whole.

Below we present some examples where we have complete losses:

Table 6. The losses of the "Correspondace's" poem

Ch. Baudelaire	M. Raifi	D. Thomollari
J'aime le souvenir de ces epoques nues..("*Correspondaces*", fq. 18)	I kujtoj me mall kohëtlakuriqe. ("*Korrespondenca",* fq. 12)	Untranslated the second part of the poetry.

The poem taken in the example is relatively long, is a poem divided into parts. In both Albanian variants we encounter differences. Translator M. Raifi does a complete translation of poetry, while translator D. Thomollari translates only the first part of it. So we have a complete loss of a part of the poetry.

Table 7. The losses of the verses and strophes

Ch. Baudelaire	M. Raifi	D. Thomollari
De Satan ou de Dieu, qu'importe? Ange ou Siréne.... ("*Hymne a la béaute",* fq. 32)	Seventh strophe-untranslated ("*Himn për bukurinë*", fq. 24)	S'ka rënëdësi je Djall apo Zot! Ëngjëll a Sirenë të jesh... ("*Himn Bukurisë",* fq. 39)
Rembrandt, triste hospital tout rempli de murmuris. ("*Les phares,* fq. 20)	Untranslated verse	Rembrandt, spitalitrishtuarzërashtëbrishtë. ("*Fanarët",* fq. 28)

In these examples, the loss occurs mainly within verse and strophes. In the first example we have the loss of the last verse of poetry. Poetry consists of seven strophes, while the translator has selected with his full awareness to bring it with six strophes. As for the second example, we are dealing with a range of poetry that is bypassed by translators. The

fullness of a poem, even a lack of a verse or a word, seriously damages poetry, not to convey the state of the situation with the same feelings and emotions as in the original text.

Table 8. The total losses

Ch. Baudelaire	M. Raifi	D. Thomollari
O cerveaux enfantins! (”*La mort*”, fq. 161)	Untranslated	Untranslated

In the aforementioned example, the author's call at the end of poetry has not been translated into Albanian textbooks. The non-translation of this call, which in fact constitutes the most emotional sense of poetry and at the same time carries its essence, seriously damages the speaker's and author's attitude at the same time, so that poem does not convey to the reader those effects that he has in the original. So, we have the case of free translators who according to E. Tupe: "*Go as far as they change, enriching in most cases the thoughts and ideas of the author, but in keeping with his style”.*(Tupja, E. 2006).

Referring to the "*The Flowers of Evil"* volume, we will notice that we have too deep volume losses. Many poems, not just verses, but full poems, are not translated into Albanian. The original work has a construct that is well-liked by the author, every part of it divided into chapters and sub-chapters is an issue for it, because if we refer to the title bearing the "Flowers of Evil" works, each poem is a separate flower and within this seemingly beautiful flower, there is a great evil. To convey the reader to this oxymoron, the author himself has made a special structure of work and poetry, which in Albanian texts is missing. In a definition of poetry given by GjergjZheji: *"Poetry is seen as a concentrated form, compressed to the maximum emotional speech; precisely for this, every word, every sound, every pause and everything else in it gains a certain coloration”.* (Zheji, Gj. 1988). For this reason, to remain as faithful as possible and as closely as possible to the source text, translators should avoid as much as possible the omissions or losses that carry cultural information and primary information about the work as a whole.

6. Conclusion

In our paper titled *"The challenges of adapting syntactic constructions to the translation of the poem of Charles Baudelaire"*, we discussed and analyzed various issues related to poetry, translators' challenges to bring in a poem of this author in Albanian. We also concentrated on the problems of literary translation, mainly poetical and the differences between the languages in the sentence plane.

The first part is, in essence, theoretical, which examines various translation problems over the years. It was initially evidenced that there was still a difficult construction of a unitary translation theory, based on scientific foundations. It should also be added that since each language has its own form of structure and therefore there is no complete line between the two languages, the same meaning can be expressed in another language, in a very different grammatical and lexical form. Translation of poetry is considered the most difficult and has been the subject of a broad discussion, where most of the discussions consist of theoretical issues regarding the possibility of translation. J. Holmes notes that "*The main problem faced by a translator of a poem, is that he in some way or another must "displacement" the original poetry not only into another linguistic context but, but, unquestionably, "displacement" will happen in another literary context or another social-cultural situation".[10]*The relationship between theory and practice in translating poetry has always been problematic. There are few theories that can provide explanations about the difficulties encountered by current practice, and the perinates that an interpreter should have. The biggest changes and challenges are encountered in language and syntax adjustments, where even the biggest losses occur in case of translation from one language into another. As a conclusion of this issue we quote E. Tupen "*translation is and should be a love act, the literary translator should love the book, in the form and content, the only way to try to do everything in its power, especially the heart to translate it best.*" (Tupja, E. 2008) In this sense, the French writer, critic and French translato*r* Valery Larbaud has the right to say: *"Tell me who translates, to tell you who you are".*

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[10] Holmes, J. S.1994," Translated Papers on Literary Translation and Translation Studies", Amsterdam-Atlanta: Rodopi

In this context, we put forward the thoughts and theories of the most renowned theoreticians in the field of translation such as Peter Newmark, Umberto Eco, Edmond Tupja, Eugene Nida, and others. In order to point out whether these theorists had consistency or different perspectives in their attitudes related to translation aspects.

We also addressed the historical-cultural aspect of Charles Baudelaire and his work. Recognizing the author's life and work as well as the historical and cultural factors that influenced him, we came to the conclusion that these factors directly affect the work and difficulty of the author's behavior in another language. We explored the language of this author, his linguistic and syntax aspects, and highlighted the degree of change of his poetry in different translations, but especially in Albanian. To concretize this fact, we analyzed an example given by Umberto Eco, who compares a Baudelaire's poem with its Albanian variant, highlighting the numerous linguistic and semantic losses. In this framework, we also analyzed the poem "*The Albatross",* comparing it to its three variants in Albanian, the variant of I. Kadare, M. Raif. D. Thomollar and concluded that Kadare's translation stands closer to the original and retains more of the syntax of the author's language.

In the second part we focused on the two language codes, Albanian and French, in the context of syntactic constructions, andof the syntax of the sentence. The sentence has definitions in different planes and sketches. E. Benveniste, a french researcher makes the sentence a discursive definition. Among other things, he regards sentence as a speech unit, which can express categorizations, questions, thoughts, feelings, based on some syntactic and grammatical rules. Thus, the sentence expresses the speaker's position depending on the different situations, so the sentence has a publishing function, which distinguishes it from other language units.

We addressed several different issues and argued that the languages in this grammar field differ from one another. We started this chapter with a general look at the sentence between the two grammars and concluded that despite the different forms, the content of this definition and what we call the sentence, remains the same. In the "*Grammar of the Albanian Language",* the sentence is conceived as a basic unit of lecture, gained on the basis of Albanian language laws, the ties and

relationships between words and limbs to express feelings, thoughts, desires, and other forms of thinking. (AshSh. 2002).

In the "*Grammar of the French language"* the sentence is, above all, a sequence of words spoken by each subject, but not only, it is able to be reproduced and interpreted, it is intuitive but has its rules and limits. (Girardet, J. P. 2002) We further dealt with the order of words in the sentence and highlighted the great differences between languages, French with an entrenched order, and Albanian with a free order. Further on duringthis section, we also discussed the changes encountered in constructing questionable and obscure sentences. At the end of this section we have considered some special constructions of the French language. According to Grammaire methodique du française: *"There are some words that accompany each phrase in French, (*which are almost never used in Albanian*), words such as ce / c'est and il y a"*[11]. So, we have come to the conclusion that every language carries some such constructions that belong to that language and at the moment of translation these types of constructions are difficult to translate because they lose the full meaning which characterizes it.

The third part, which we can say is the most important head of this paper, for the fact that it deals with the linguistic analysis of the work, the translation gains that MensurRaifi and DritanThomollari have chosen to bring from French to Albanian. We have addressed several issues about the changes that have undergone syntactic constructions. Unlike French, the order of limbs in sentences in Albanian is not generally embedded. According to M. Çeliku: *"There is a common sentence order, that it can change without substantially altering the syntax, most of the time with changes in syntax and stylistic colors for various reasons"*. (Çeliku, M. 2008) We note the changes that have come to the subject, which originally starts the verse, while in the translations into Albanian it loses, or in its place we have the right / oblique opponent or the other second limb. We also encounter variations between variants in Albanian, but it should be said that M. Raif's translation is more accurate, while maintaining some important specifics of syntactic constructs. Another important thing to note is the

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[11]Martin, R. Pellat,J. Rioul,R. (2014). *Grammaire methodique du française.* Paris: Press Universitares de France.

order of words in the verse. Poetry in the original despite being poetry and in such a literary genre for various metric and stylistic causes become deviations of syntactic constructions, while Baudelaire, in most of his poems has maintained the rigid order of words in verses. So, we have a structure of the Subject + Predicate + Object type, which in the variant in Albanian is not preserved since the Albanian language has a free order of words in sentences.

In the course of this approach, we also dealt with the changes that have been made to grammatically unrelated words in the verses. The reason we chose grammatically unrelated words in sentences is, in our case, the fact that these types of poetry have a significant role, such as constructing the string, also carry a certain stylistic metric role. Another reason is because, for our opinion, there is a challenge for an interpreter, these types of words often suffer losses, the most varied changes in translation processes. Another issue to be considered is the phenomenon of homogeneity. According to the Grammar of the Albanian language: "*Homogeneous limbs are called those limbs that fulfill the same syntactic functions, are in the same relationships with the same limb and in meaningful coordination reports between them, by joining with coordinating and asymmetric relations.*" (AshSh. 2002) The selected work is distinguished for such a feature, which is very important, both linguistically and stylistically because it gives the effect of the string. To have homogeneity, words must be in equality reports and have the same syntax functions. Thus the translation of these limbs becomes a challenge, because the translators in most cases do not convey this phenomenon in their variants, and also despite the fact that we may have one word after the other, they are not homogeneous to one another. It should be said that in this aspect closer to the original again results the translation of MensurRaifi. Finally, we have dealt with the total loss of poetry. Thus, we notice these losses in idioms, proverbs, or in those untranslated parts that have cultural undertonesin their content and constitute a meaning for the work as a whole.

If we look at the poetic volume in its entirety, there are many untranslated poems, numerous verses and strophes lost, which directly affect the structure of the work that is well liked by the author. U. Buçpapaj think that*: "In poetry, perfection is not only achieved by choosing words and figurative language, but also through the creation*

of rhythm, rhyme, metrics, expressions, and specific structures, which may not coincide with those of daily language". (Buçpapaj, U. 2009) The structure itself constitutes the whole significance of Baudelaire's poetry. To conclude, we can say that in the process of dealing with some important issues of translation theory in general, the differences between two syntactic languages, the translation of the linguistic and syntax elements of poetry from the French into Albanian language. We hope to shed light on the above-mentioned issues. We also hope that this work has accomplished its purpose and serves as an incentive for further studies in the context of Albanian translation studies, especially of linguistic and literary studies, for this very important author of French and world literature as well.

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APPLIED SCIENCES
SHKENCA TË APLIKUARA

OVERVIEW OF SECURITY IN WIRELESS MESH NETWORKS (WMNs)

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Abstract
Security issues of WMNs cannot be ignored. In WMNs the understanding and properly dealing with these problems and challenges is very necessary. WMNs lacks in security solutions due to dynamic change of network topology, distributed network architecture and shared wireless mediums WMNs lacks in security solutions. Attacks can occur on different protocol layers which can harm the network traffic and data. There are different types of architecture which may uses different approaches for wireless mesh security purpose. Many challenges can be seen in WMNs due to its dynamic change in the network. For mesh router and mesh clients same security solutions will not work because they have a lot of different features such as mobility and power constraints.
In this article, security challenges and goals will be presented, also an overview of potential attacks related to Wireless Mesh Networks and proposed solutions.
Keywords: WMN, attacks, solution, security, wireless.

1. Introduction

Wireless Mesh Networks (WMNs) provides Internet connectivity in an area, at a much lower cost comparing with classic wireless networks. They cover a wide geographic area with a limited transmit power accordingly. These are multi-hop wireless with a high data rate and low deployment and maintenance overhead. Wireless mesh networks (WMNs) WMN's have properties of an autonomic system, mentioning here:

-
                                             Sel
f-configuration;

-   Sel
f-management;
-   Sel
f-healing;
-   Sel
f-optimization, etc.

WMNs offer a mesh topology peer-to-peer with wireless links between mesh routers. This idea helps to beat many of today's deployment challenges, mentioning here the installation of Ethernet cabling, and enables new deployment models.

Their two types of nodes are: mesh router and mesh client. Mesh routers create the mesh backbone for mesh clients, who can also function as a router for mesh networking, with a much simpler hardware and software platform compared to mesh routers. Mesh routers are typically stationary and don't have energy constraints, but the clients are mobile and energy constrained. There is no wired infrastructure to deploy within the case of WMNs, being considered cost-effective alternatives to WLANs (wireless local area networks).
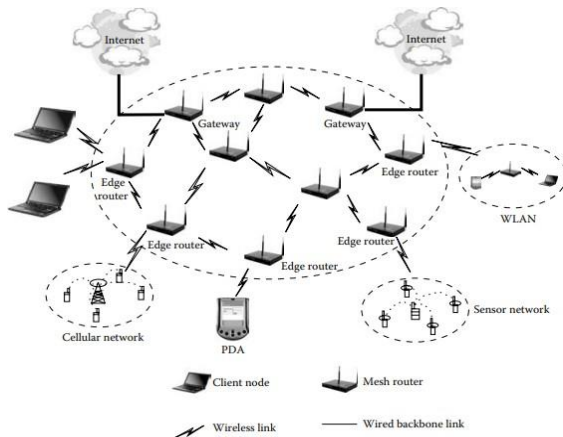
Fig. 1 WMN Architecture

Many researches have been done in recent years related to WMN aspects, mostly focused on their protocols for multi hop routing, leaving in this way the aspect of security unexplored. Because of the characteristics of WMNs, they are highly susceptible to security attacks compared to wired networks. Designing a foolproof security mechanism for WMNs may be a challenging task. Various layers of the protocol stack can provide security.

In this paper, first, we look at the general characteristics of WMNs and their main issues in section 2. In section 3, we identify the security issues as attacks, presenting also the main security challenges of these networks and then we look into the Security Solutions and Mechanisms in the last section.

2. Issues in WMNs

As mentioned above, WMNs are multi-hop wireless networks like ad hoc network, so
The ad hoc networks protocols work in a good way also for WMNs. A list of issues in each layer of the protocol stack and system implementation is given as below:

2.1. Capacity

As mentioned above, WMNs offer a high-bandwidth connectivity to the users and there are many factors that affect its capacity such as architecture of the network, density of nodes, number of used channels, node mobility, and pattern of traffic and transmission range. The effects of these factors on WMNs capacity are related with the protocol design, architecture design, and deployment of WMNs. The IEEE 802.11 provides some channels in the radio spectrum, but they may interfere with each other. It means that if they are used in the same time, the data gets corrupted. The solution is the use of non-overlapping channels in the same time, without data collision. IEEE 802.11b provides 3 such non overlapping channels at 2.4 GHz band and IEEE 802.11a provides 13 non-overlapping channels at 5 GHz band. These orthogonal channels improve the capacity of the network.

Each node has more than one radio interface (m) and each interface is assigned one of the orthogonal channels available (n). Normally m<n because of interface cost and the nodes complexity. Furthermore, when m < n the capacity bound of a multi-channel multi-radio wireless mesh network depends on the ratio of n and m.

2.2. Physical Layer

The capacity of the network is depended on the used technique of physical layer. There are some of these techniques used to improve the capacity of WMNs:

- *OFDM* (Orthogonal Frequency Division Multiplexing): The frequency spectrum is divided into many sub-channels. Each sub-channel modulates each low bit rate stream that in transmitting. It works in the cases of multi-path and narrow-band interference, without complex equalization filters at the transmitter and receiver. The transmission rate of IEEE 802.11 networks increases from 11 to 54 Mbps.

- *MIMO* (Multiple-Input Multiple-Output) is a technology with effective cost that provides high bandwidth wireless links. It increases the spectral efficiency of a wireless communications system. MIMO provides throughput increase with the same bandwidth and overall transmission power. This happens using the multi-path propagation phenomena in wireless communications.

- *Smart Antenna:* This technique adds adding the directionality for transmission and reception of signals at both antennas (Tx and Rx), improving in the way the capacity of wireless networks and energy efficiency in the same time. It reduces the interference between different nodes in the network. The use of a directional antenna necessitates special MAC (Medium Access Control) protocols to support directionality in transmission and reception.

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2.3. Routing

As we mentioned before, the protocols designed for ad hoc networks also work for WMNs. They should adapt quickly with the change when there is path break for example, because of nodes mobility. Some of ad hoc routing protocols are AODV (Ad hoc On-Demand Distance Vector), TBRPF (Topology Broadcast based on Reverse Path Forwarding) and DSR (Dynamic Source Routing). As WMN mesh routers have minimal mobility and there is no power constraint, whereas the clients are mobile with limited power. Finding a reliable and high throughput path is the main concern rather than quick adaptation to link failure as in the case of ad hoc networks, because the links in WMNs have a long life.

2.4. Power Management

The power management goal in WMNs is depended on the network nodes. In general, mesh routers do not have a constraint on power consumption, but on the other hand, mesh clients may need protocols

that are power-efficient. It may happen that WMNs should manage power in order to optimize both power efficiency and connectivity, which may be a difficult problem. Transmitting a number of packets from a node, with a given amount of energy is the reason why higher energy efficiency is required.

2.5. Security

Their characteristics make WMNs more vulnerable to security attacks than wired networks. Designing a mechanism that provides security for WMNs is a challenge. It can be provided in different layers of protocol stack. The issues listed below explains why it is difficult to provide security in WMNs:

- *Shared Broadcast Radio Channel:* The wireless links are broadcasted between nodes, while in the wired network there is a dedicated transmission line. It means that there is a high probability that a malicious node could obtain data being transmitted in the network if it is located in the transmission range of mesh routers or client.
- *Lack of Association:* As the mesh routers create a fixed topology, the clients on the other hand can join or leave the network at any time. From this point of view, an authentication mechanism is required in order to prevent the network from the "desire" of any intruder to join it.
- *Physical Vulnerability:* This issue is related to the physical aspect, for example depending on their location, the mesh routers may be vulnerable to theft and physical damage.
- *Limited Resources:* The mesh clients, being limited in terms of bandwidth, battery power, and computational power, it makes the implementation of a complex cryptography based mechanism, a difficult reality for clients, but it can be implemented at mesh routers, as they do not suffer from limited resources. Because of the wireless connectivity between mesh routers, they also have bandwidth constraints.

3. Security Issues and Attacks

The attackers can influence on the network performance. The nodes in WMNs are connected together in order to provide connectivity in the network and the Internet. The MAC layer protocols and also the routing

ones assume that all the nodes behave well without any bad intention. From this point of view, nodes are independent to transmit, based on the availability of the wireless channel. Each of them choose its own route based on the specification of the routing protocol and share this information with other nodes. They do not verify it or even the transmitted information. Some of them are considered as "selfish" ones and the others may be influenced from "bad" users. This makes WMNs vulnerable to active attacks, mentioning here rushing, black hole, etc. The bad nodes may drop some data packets or all of them, instead of forwarding them. Taking into consideration that all the nodes are not owned by one administrator, it may harm the integrity and confidentiality of the data. It is derived from the fact that a copy of all the data for offline crypto-analysis and information is kept by the intermediate nodes. It is also possible that malicious nodes may insert bad packets in the network, which can cause a DoS attack.

The attacks can be external or internal ones. The external attacks happen when the intruder is not part of WMN, but has an illegal access to the network. In other words, they are caused by external nodes. Authentication and encryption techniques can prevent them. The internal attacks happens by nodes in the network, for example when they drop packets instead of forwarding them.

Now, we are considering the attacks that affect the layers of the core network: Physical, Mac and Network ones. The Transport and Application Layers are implemented in the end users side, so their attacks are not depended on the network.

3.1. Physical Layer Attacks
Radio jamming are vulnerable attacks at the first layer. It happens when a wireless device is allowed to transmit a strong signal, causing in this way an interference and the packets cannot be transmitted under these conditions. Sometimes, the attacker is clever. It transmits only when it senses some activity in the channel and otherwise it remains quiet. These attacks are considered as noise in the channel and the BMAC which is MAC protocol adjust the threshold value of SNR at the receiving node, in order to overcome these attacks. If the attacker transmits the constant noise, it is called pinpoint jamming attack. When the attacker sends a small periodic signal, it is periodic jamming attack and when the node detects the attacker's transmission, it is called

reactive jamming attack. Also, the attacker could damage the hardware, for example the routers, if they are located outdoor. So, the attacker can get the information easily.

3.2. MAC Layer attacks

There are many possible attacks in the MAC layer, as following:

3.2.1 Passive Eavesdropping

Having a broadcast configuration means that the attackers may eavesdrop their transmission in a passive way. There are also internal attackers that can contribute in this way. A bad node in the network may keep the data for itself without transmitting it. These attacks damage both data integrity and confidentiality, which can be protected by using strong encryption techniques.

3.2.2 MAC Spoofing Attack

The modification of MAC address during the frame transmission. So, the attacker can be hidden from the IDSs (Intrusion Detection Systems) there. The network administrators "filter" MAC addressed and allow inly the registered ones to connect to the APs (Access Points). In this point, the attacker can peep the network and "masks" as a legal user in order to penetrate there. It may insert many harmful frames into the network, causing in this way DoS.

3.2.3 Replay Attack

This type of attack may be caused by internal and external nodes. A node, which is not part of WMNs can eavesdrop the broadcasted communication in the network and decides to transmit these messages after a while. Acting in this way, it can access the network. Also a node from inside can transmit at a later time, the copy of saved data.
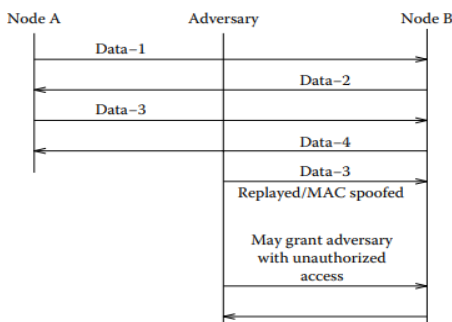

Fig. 2 Replay Attack scenario

3.2.4 Jamming Attack

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These attacks can also happen in MAC layer, but in a more complex way than in the physical layer. In this case, the attacker may transmit on the channel the headers of frames, without payload. This occupies the channel and it seems busy to the network nodes, which are ready to transmit. They wait some time before trying to transmit again. This causes DoS (Denial of Service).

3.3. Network Layer Attacks
These types of attacks are grouped in Control Plane attacks and Data Plane attacks. The first group damages directly the routing function, while the second ones influence on the forwarding function. Let's consider the attacks in the first group:

3.3.1 Rushing attacks
These attacks discovered the routing process of on-demand routing protocols (ex. AODV), which use the Route Request Message. The attacker keeps the nodes busy, sending many routing packets in the network. It means that this "bad" node sends the message to the target node before other intermediate nodes.

3.3.2 Wormhole attacks
In this case, two or more nodes with bad intentions, create a tunnel between each other and the Route Discovery messages go there during the forwarding process. The nodes that created the tunnel, drops the packets which results in a denial of service, as shown in the fig. below.
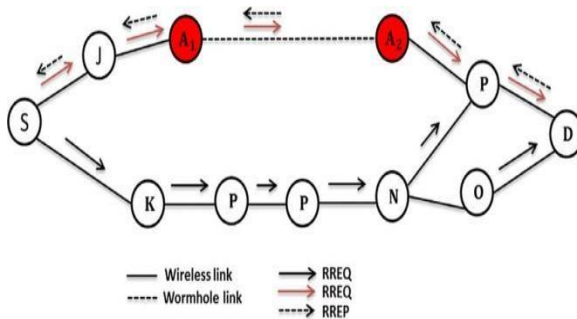

Fig. 3 The Wormhole attack process

3.3.3 Sink Hole Attack (Black Hole)
The malicious node always replies positively to all the routing messages it gets, even when there is no path from the source to the destination, which means that it may drop all the packets, without forwarding any of them. When there are many of these nodes

collaborating together, the situation is totally destructive regarding to the routing table.
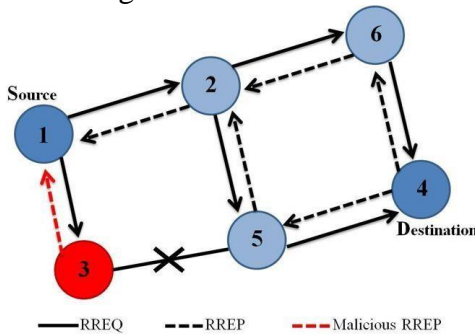
Fig. 4 Black Hole attack

3.3.4 Sybil Attack

This attack happens when a node with bad intentions shows different identities in the network. All the other internal nodes consider these identities as normal ones and put them in the list to create the path to the destination. The packets passing through these nodes, may suffer also from any of the above attacks that these nodes may launch.

3.3.5 Routing Loop Attacks

These attacks occur when the packet circulate in a closed loop inside the network. Every time it circulates, the hop counter increases by one. When this counter gets a maximum value, the packet is discarded from the network.

The other group of Network Layer attacks are Data Plane ones. They attack the function of path forwarding, having a bad impact on the performance and leading to denial of service in the network. One of these attacks is eavesdropping in a passive way. We mentioned and explained it earlier in the MAC attacks section. When internal nodes behave in a selfish way, it is considered as a big security problem because they forward packets in an independent way and they may choose not to forward the packets. They may drop some of them or even all of them. It is also possible that these nodes with bad intentions could insert junk packets in the network, which damage the routing function. In few words, the control plane attacks depend on these crafted control packets that disturb the normal operation of the network. The simplest way to control the attack is eavesdropping.

4. Security Goals and Challenges
There are some goals that should be considered in order to save the network from the above attacks.

4.1 Confidentiality
It means protecting the information from disclosure. The data should arrive at the destination, without being discovered from the others during the path. Users should know each other for security reasons. It ensures that the data packets cannot be accessed from foreign users. The level of confidentiality is related to the level of data sensitivity.

4.2. Availability
This goal ensures the availability of the network to its users. DoS influences directly on it, so the network needs to be protected against Denial of Service. The network should offer a reliable data transmission from the source to the destination.

4.3. Integrity
It means that the data can be modified only from the authorized users. This goal should ensure the data accuracy during the whole life cycle.

4.4. Access Control
It means that only authorized actions should happen. It regulates who can use the resources or perform a task.

4.5. Authorization
According to this method, a right should be provided from an authority for each user who wants to access the network.

4.6. Nonrepudiation
This property defines that the sender can't deny of sending messages and the receiver on the other hand, can't deny receiving these messages. There are many challenges related to Wireless Mesh Networks. This happens because of their dynamic nature. First of all, nodes' physical security is a big problem. Furthermore, being a multi hop wireless communication doesn't allow the administrator to apply a static security configuration for the entire network because the users come and leave constantly. The security solutions of mesh routers should

differ from those of clients, as they do not have the same characteristics.

Wireless networks do not have a single point central controller or even any mesh routers protections, which are considered as their security challenges. They make the network easily attacked from the attackers.

5. Mechanisms for Security in WMNs

There are some qualities that a mechanism should have in order to be able to provide security in a network. The Recommendation X.800 ITU-T determines the security services for networks. These services include access control, authentication, confidentiality, integrity etc. and they are divided into two big groups: intrusion prevention and intrusion detection.
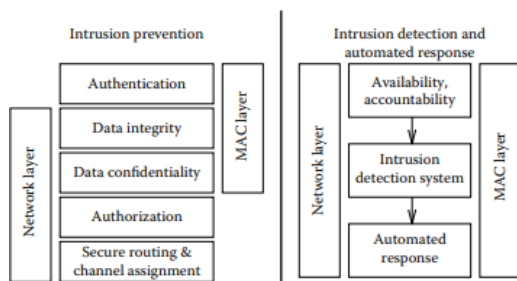
Fig. 5 Security model for WMNs

We all know that is better to prevent than to detect. In the first case, it should take measures to prevent the attacker from penetrating into the network, but we should admit that it's not enough to provide a full protection of the network from all types of attacks. The second group of services consist on the identification of the actions that are related to possible attacks in the near future. The detection in early stages, decreases the attack's effects in the network.

As it is shown in fig. 5, different services that provide security work together in a WMN. Both these groups of security services are considered for MAC and Network Layers of Wireless Mesh Networks.

5.1 Security Mechanisms of MAC Layer

CSMA/CA (Carrier sense multiple access with collision avoidance) with RTS/CTS (Request to Send and Clear to Send) is a widely used mechanism for WMNs. Based on RTS-CTS messages, IEEE 802.11 uses DCF (Distributed Coordination Function) to plan the wireless

resources, on mesh networks. A node that wants to transmit messages, firstly sends a RTS message and the destination node on the other hand replies also with a RTS message, telling that it's ready to get the transmitted messages. Any other node isn't able to transmit during this period of transmission. There is also the scheme of Binary Exponential used to understand if the channel is available or not. It considers as the winner, the last node from those that are competing with each other. The MAC layer security mechanisms are divided into two groups:

5.1.1. Intrusion Prevention Techniques

These techniques satisfy the necessary requirement in order to secure the MAC layer of the network and the majority of them are based on cryptography. There are two security keys used for authentication: SAK (Secret Authentication Key) and SSK (Secret Session Key). SAK is applied immediately after initial authentication from the server, while SSK is applied for a communication session among nodes. This pair of keys is used to generate Permutation Vector (PC), which ensures data encryption and decryption. It increases the level of security at MAC Layer. The MPDU (Mac Protocol Data Unit) provides the PV synchronization between the sender and receiver.

5.1.2. Intrusion Detection Techniques

There are few detection techniques proposed for WMNs. A system proposed and developed by Liu et al. It was proposed a way to find an optimal strategy for intrusion detection. The challenge is that some detection mechanisms are suitable for detecting some attacks, but not for all of their types. So, a strategy combination may increase the level of security. The detection techniques of MAC layer can detect the launched attacks by nodes with bad intentions that don't obey the protocol of MAC layer, for example DoS or jamming ones.

5.2. Secure Routing

The data packets in WMNs travel in many hops from the source to the destination, so the routing protocols should enable the self-configuration of routing tables, quick self- adaptation to path quality changes, etc. The WMNs' routing protocols are very similar to ad hoc ones.

5.2.1. Cryptography Solutions

These solutions defend from external attacks. Authenticated routing for ad hoc networks (ARAN) uses cryptography certifications to provide

authentication. Firstly, it is attached from the sender and signed with the private key and the receiver on the other hand after checking the validation of the certificate using CA's public key and then controls the integrity of the message. In other words, ARAN in a protocol in which the routing messages are signed from the sender and confirmed from the receiver on the other hand.

5.2.2. Neighbor Monitoring

This technique defends the Network Layer from the internal attacks. It consists on the discovery of bad nodes in the network. When a node transmits a packet, it should monitor if its neighbor forwards it correctly to the next hop. All the nodes keeps a rating record of the other nodes they know and also the bad behavior of any node, which decreases the rating. These nodes with low ratings are not considered for the route or packets from the source to the destination, because they are labeled as non-trust ones.

6. Conclusions

This paper addressed the issue of Security of Wireless Mesh Networks. This has been an important area of research in the recent years.

The main issues related to these networks, including capacity, physical issues, routing ones, power management, etc. were considered in the first section. The security issues and challenges have been discussed, figuring out the "weak" points of these networks. The different types of attacks on MAC and Networks Layers have been mentioned and explained in details. Also, security techniques and mechanisms used for prevention, detection and facing with these attacks have been considered. The basic mechanisms used to provide MAC security and Routing security and also IEEE 802.11 standard for wireless communication were addressed. It's important to emphasize that some security approaches need to collaborate with each other, depended on the requirements of the applications and the desired level of security.

In general, the great demand for having high bandwidth networks has been the main focus, while the security and privacy issues have taken the back seat.

There are also some open problems related to WMNs, which can be a very interesting direction of research in the future.

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SOME RESULTS ON LEFT REGULAR Γ-SEMIGROUPS

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Abstract

The aim of this paper is to reprove some known results on left regular Γ-semigroups by using some techniques established by E. Pasku in "The adjoin semigroup of a Γ- semigroup", Novi Sad J. Math. Vol. 47, No. 2, 2017, 31-39 where a Γ-semigroup S is embedded into an ordinary semigroup Σ in such a way that ideals, one sided ideals and quasi-ideals of S are in a one to one correspondence to those of Σ. This correspondence allows to interpret problems in S as their counterparts in Σ, solve them in Σ and then use the correspondence to get the solution back in S. First we prove that the above mentionedcorrespondence can be extended for the left ideals and for the Greens relation L as well, and then as an application of them we provide that a Γ-semigroup S is left regular if and only if it is decomposable into left simple sub-semigroups of S. Differently from other authors, we obtain these results as implications of their well knowns counterparts in semigroup theory.

Keywords: Γ-semigroup, semigroup, left regular, left ideals, L-class.

1. Introduction and preliminaries

Let S and Γ be two nonempty sets. Any map from $S \times \Gamma \times S$ to S will be called a Γ-multiplication in S and denoted by $(\cdot)_\Gamma$.

The result of this multiplication for $a, b \in S$ and $\gamma \in \Gamma$ is denoted by $a\gamma b$. According to Sen and Saha [5], a Γ-semigroup S is an ordered pair $(S; (\cdot)_\Gamma)$ where S and Γ are nonempty sets and $(\cdot)_\Gamma$ is a Γ-multiplication on S which satisfies the following property

$$\forall (a, b, c, \alpha, \beta) \in S^3 \times \Gamma^2, \ (a\alpha b)\beta c = a\alpha (b\beta c).$$

Here we give some notions and present some auxiliary results in plain semigroups and in Γ-semigroups that will be used in this paper. Some

of the results regarding Γ-semigroups and semigroups may be found in [2] and [3] but for the reader's convenience we have restated them below.

Let S and Γ-semigroup and A, B subsets of S. We define the set

$A\Gamma B = \{a\gamma b \mid a \in A, b \in B \text{ and } \gamma \in \Gamma\}$.

For simplicity we write $a\Gamma B$ instead of $\{a\}\Gamma B$ and similarly we write

$A\Gamma b$ instead of $A\Gamma\{b\}$ and $A\gamma B$ instead of $A\{\gamma\}B$. Now we give some necessary definitions by semigroup theory and Γ-semigroup theory.

Definition 1.1.[3] *A semigroup S is left regular, if for any element a of* S, $a \in Sa^2$.

Definition 1.2.[2] *A* Γ*-semigroup* S *is left regular, if for any element a of S and* γ *of* Γ, $a \in S\Gamma a\gamma a$.

Definition 1.3.[3] *A semigroup S is left simple if for every* $a \in S$; $Sa = S$.

Definition 1.4.[2] *A* Γ *semigroup S is left simple if for every* $a \in S$; $S\Gamma a = S$.

Definition 1.5.[3]*A nonempty subset A of a semigroup S is a left ideal of S, if* $SA \subseteq A$.

Definition 1.6.[2] *A nonempty subset A of a* Γ*-semigroup S is a left ideal of S if* $S\Gamma A \subseteq A$.

Definition 1.7.[3] *A nonempty subset A of a semigroup S is a subsemigroup of S, if* $a, b \in A$ *implies* $ab \in A$.

Definition 1.8.[2] *A nonempty subset A of a* Γ*-semigroup S is a subsemigroup of S, if* $a, b \in A$ *and* $\gamma \in \Gamma$ *implies* $ab \in A$.

Definition 1.9.[3] *A subset A of a semigroup S is called semi-prime if* $a^2 \in A$, $a \in S$ *imply* $a \in A$.

Definition 1.10.[2]*A subset A of a* Γ*-semigroup S is called semiprime if for every* $a \in S$ *and every* $\gamma \in \Gamma$ *such that* $a\gamma a \in A$, *we have* $a \in A$.

In this paper we intend to reprove some known results on left regular Γ-semigroups by using some techniques established by E. Pasku in [1], where a Γ-semigroup S is embedded into an ordinary semigroup Σ_{γ_0} in such a way that ideals, one sided ideals and quasi-ideals of S are in a one to one correspondence to those of Σ_{γ_0}. This correspondence

allows to interpret problems in S as their counterparts in Σ_{γ_0}, solve them in Σ_{γ_0} and then use the correspondence to get the solution back in S.

To define Σ_{γ_0} we let F be the free semigroup on the disjoint union

$S \bigcup \Gamma$. Its elements are finite strings $(x_1, x_2, \quad \dots, x_n)$ where each $x_i \in S \bigcup \Gamma$. Now we define Σ_{γ_0} as the quotient semigroup of F by the

congruence generated from the set of relations
$((\gamma_1, \gamma_2), \gamma_1, ((x, \gamma, y), x\gamma y) ; ((x, y), x\gamma_0 y)$,
for all $\gamma_1, \gamma_2 \in \Gamma$, all $\gamma \in \Gamma$, all $x, y \in S$ and with $\gamma_0 \in \Gamma$ a fix element.

Lemma 1.1.[1] *Every element of Σ_{γ_0} can be represented by an*

irreducible word which has the form (γ, x, γ'), (γ, x), (x, γ), γ or x where $x \in S$ and $\gamma, \gamma' \in \Gamma$.
This Lemma shows in particular that the natural epimorphism $\mu : F \to \Sigma_{\gamma_0}$ is injective on S and Γ. In what follows we will identify

the elements of Σ_{γ_0} with the irreducible words from F they are

represented of written without brackets and commas, and if we want to multiply in Σ_{γ_0} two such words, we take their concatenation and then

find its irreducible form. For instance, the product in Σ_{γ_0} of x with y

is $x \cdot y = x\gamma y$. We call Σ_{γ_0} the *adjoint semigroup* of the given Γ-semigroup.

2. Main results
Lemma 2.1.*If L is a left ideal in a Γ -semigroup S, then L Γ is a left ideal in S Γ .Conversely, if f = {$l_i\gamma_i$ |$l_i \in$ S and $\gamma_i\epsilon$ $\Gamma$with i $\in$ I}is a*

left ideal of $S\Gamma$ *, then the set* $L = \{l_i|\ i \in I\}$ *is a left ideal of* S.

<u>Proof.</u> If L is a left ideal in Γ-semigroup S then for every $s \in S$, $l \in L$ and $\gamma \in \Gamma$ we have $s\gamma l \in L$.

We need to prove that $L\Gamma$ is a left ideal in $S\Gamma$, where $S\Gamma$ is the sub-semigroup of Σ_{γ_0} consisting in elements $s\gamma$ where $s \in S$ and $\gamma \in \Gamma$. If we take $s\alpha \in S\Gamma$ and $l\beta \in L\Gamma$, for $s, l \in S$ and $\alpha, \beta \in \Gamma$ then

$$(s\alpha)(l\beta) = (s\alpha l)\beta \in L\beta \subseteq L\Gamma,$$

which shows that $L\Gamma$ is a left ideal in $S\Gamma$.

For the converse, let $x \in S$, $l_i \in L$ and $\beta \in \Gamma$. We want to show that

$x\beta l_i \in L$. Consider the product $(x\beta l_i)\gamma_i \in S\Gamma$, where $\gamma_i \in \Gamma$ is such that $l_i\gamma_i \in f$. For that element we have
$(x\beta l_i)\gamma_i = (x\beta)(l_i\gamma_i) = l_j\gamma_j \in f$,

since f is a left ideal of $S\Gamma$, then in particular we must necessarily have $x\beta l_i = l_j$ so $x\beta l_i \in L$ which proves that L is a left ideal of S. ∎

At Niovi [2] is proved the next proposition:

Proposition 2.1. *A Γ-semigroup S is left regular if and only if the left ideals of S are semi-prime.*

From the standard theory of semigroups [3] is proved the next proposition:

Proposition 2.2. *A semigroup S is left regular if and only if the left ideals of semigroup S are semi-prime.*

Now here we reprove proposition 2.1 as a direct implication of proposition 2.2 by using Σ_{γ_0}.

Proposition 2.3. A Γ-*semigroup S is left regular if and only if the left ideals of S are semi-prime.*

Proof. For the direct implication we assume that S is a left regular Γ-semigroup and want to prove that any left ideal L of S is semi-prime. As an intermediate step we prove that $S\Gamma$ is left regular in Σ_{γ_0}. To this end we need to show that

$\forall \alpha, \gamma \in S\Gamma$, $\alpha\gamma \in S\Gamma(\alpha\gamma)^2$.

Since the Γ-semigroup S is left regular, we have that $\alpha \in S\Gamma a\gamma\alpha$, $\forall a \in S$, $\gamma \in \Gamma$. This means that

$\exists s \in S$ and $\beta \in \Gamma$, $a = s\beta a\gamma\alpha$,

then

$\alpha\gamma = s\beta a\gamma\alpha\gamma = s\beta(\alpha\gamma)^2 \in S\Gamma(\alpha\gamma)^2$.

If we apply the left regularity of $S\Gamma$ to $L\Gamma$ which by Lemma 2.1 is a left ideal in $S\Gamma$, then from proposition 2.2 it has to be semi-prime. We prove now that L is semi-prime in S. For this we must show that for every $a \in S$ and $\gamma \in \Gamma$, $a\gamma a \in L$ implies that $a \in L$. Since $a\gamma a \in L$, then

$$a\gamma\, a\gamma = (a\gamma\, a)\gamma \in L\gamma \subseteq L\Gamma \,,$$

so $(a\gamma)^2 \in L\Gamma$, and since $L\Gamma$ is semi-prime then $a\gamma \in L\Gamma$, hence $a \in L$ proving that L is semi-prime.

Conversely, we assume that the left ideals of the Γ-semigroup S are semi-prime and want to prove that S is a left regular Γ-semigroup. We will prove first that for any fixed $\gamma \in \Gamma$, the semigroup S_γ is a left regular semigroup which amounts to saying that any left ideal f of S_γ is semi-prime. If $f = \{l_i\gamma | l_i \in S \text{ with } i \in I\}$, then from lemma 2.1 the set $L = \{l_i | i \in I\}$ is a left ideal of S. Let $x\gamma \in S_\gamma$ such that $(x\gamma)^2 \in f$ then $(x\gamma x)\gamma \in f$, so there is an index $i \in I$ such that $x\gamma y = l_i \in L$. Now

since L is a left ideal of S it has to be semi-prime, therefore $x = l_j \in L$ for some $j \in I$. So we have $x\gamma = l_j\gamma \in f$.

Finally, we have to prove that S is a left regular Γ-semigroup, which means that $a \in S\Gamma a\gamma a$, $\forall a \in S$, $\gamma \in \Gamma$. For the fixed operator γ we know from the above that S_γ is left regular semigroup hence for the above $a \in S$, we have that

$a\gamma \in S\gamma(a\gamma)^2$.

This means that $\exists s \in S$ such that

$a\gamma = s\gamma(a\gamma)^2 = (s\gamma a\gamma a)\gamma$,

then after canceling out we get

$a = s\gamma a\gamma a \in S\Gamma a\gamma a$.

This proves that S is left regular Γ semigroup. ■

From [2] we have the next theorem:

Theorem 2.1. A Γ-*semigroup S is left regular if and only if there exists a family* $\{S_\alpha \mid \alpha \in I\}$ *of left simple sub-semigroups of S such that*

$S = \bigcup_{\alpha \in I} S_\alpha$.

In [3] it is proved the following theorem:

Theorem 2.2.*The following are equivalent conditions on a semigroup.*
(a) *S is left regular.*
(b) *Every left ideal of S is semi-prime.*
(c) *Every f-class of S is a left simple sub-semigroup of S.*
(d) *Every f -class of S is a sub-semigroup of S.*
(e) *S is a disjoint union of left simple sub-semigroups.*
(f) *S is a union of left simple sub-semigroups.*

We reprove theorem 2.1 as a direct implication of theorem 2.2 by using Σ_{γ_0}. Before we need this:

Lemma 2.2. *Writing by f^S for the Green relation f in the Γ - semigroup (S, Γ), and by $f^{S\Gamma}$ for the Green relation f in the semigroup $S\Gamma$, we have that for every $a, b \in S$ and every $\gamma \in \Gamma$, $af^S b$ if and only if $(a\gamma) f^{S\Gamma} (b\gamma)$.*

Proof. If we have $af^S b$ for every $a, b \in S$ from the proposition of Green relation in the Γ-semigroup (S, Γ), exist $x, y \in S$, $\alpha, \beta \in \Gamma$ such that $a = x\alpha b$ and $b = y\beta\alpha$.

Since f is a right congruence, then we have $a\gamma a f^S b\gamma a$, which means that

$a\gamma a = x\alpha b\gamma a$ and $b\gamma a = y\beta a\gamma a$.

By cancelling a we get $a\gamma = x\alpha b\gamma$ and $b\gamma = y\beta a\gamma$, for every $a, b, x, y \in S$ and $\alpha, \beta, \gamma \in \Gamma$, so we have $(a\gamma)f^{S\Gamma}(b\gamma)$.

Conversely if we have $(a\gamma)f^{S\Gamma}(b\gamma)$ for every $a, b \in S$ and every

$\gamma \in \Gamma$ from the proposition of Green relation f in the semigroup $S\Gamma$ of Σ_{γ_0}, exist $x\alpha, y\beta \in S\Gamma$ such that $x\alpha a\gamma = b\gamma$ and $y\beta b\gamma = a\gamma$. By

cancelling γ we get $x\alpha a = b$ and $y\beta b = a$ for every $a, b, x, y \in S$, and

$\alpha, \beta \in \Gamma$ which means $af^S b$. ∎

Theorem 2.1. A Γ-*semigroup S is left regular if and only if there exists a family* $\{S_\alpha | \alpha \in I\}$*of left simple sub-semigroups of S such that* $S = \bigcup_{\alpha \in I} S_\alpha$.

Proof. Assume that the Γ-semigroup S is left regular. From the proof of the proposition 2.3 we know that $S\Gamma$ is left regular regarded as a sub-semigroup of Σ_{γ_0}. Theorem 2.2 applied to $S\Gamma$ shows that every f-class of $S\Gamma$ is a left simple sub-semigroup of $S\Gamma$ and that $S\Gamma$ is a union of left simple sub-semigroups. Now we will prove that the assumption that every f-class of $S\Gamma$ is a left simple sub-semigroup implies that every f-class of the Γ-semigroup S is a left simple Γ - sub-semigroup of (S, Γ).

First we prove that for every $\alpha \in S$, L_α is a Γ-sub-semigroup of (S, Γ) which is the same as to say that for every $\gamma \in \Gamma$, $\alpha \gamma \alpha \in L_\alpha$.

For that particular γ above we know that $L_{\alpha\gamma}$ is a sub-semigroup of

$S\Gamma$ which implies that $(a\gamma a\gamma)f(a\gamma)$ in Σ_{γ_0}. This shows that there is

$b\beta \in S\Gamma$ such that $(b\beta)(a\gamma a\gamma) = a\gamma$. Canceling out γ we obtain $b\beta(a\gamma a) = a$ which proves that $(a\gamma a)fa$ in (S,Γ). Thus L_α is a sub-semigroup of (S,Γ).

Secondly, we have to prove that L_α is a left simple Γ sub-semigroup of (S,Γ). This means that for every $b \in L_\alpha$, we must have $L_\alpha\Gamma b = L_\alpha$. Recall that $L_\alpha\Gamma b$ is the set of elements $\{x\gamma b ; x \in$

L_a and $\gamma \in \Gamma\}$. Using the left-simplicity of $L_{\alpha\gamma}$ in $S\Gamma$ we will prove that for every $\gamma \in \Gamma$, $L_\alpha\gamma b = L_\alpha$ which would be sufficient to prove the

equality $L_\alpha\Gamma b = L_\alpha$. For the elements b and γ as above, the fact that $b \in L_\alpha$ implies that $b\gamma \in L_{\alpha\gamma}$ in Σ_γ. The left-simplicity of $L_{\alpha\gamma}$ now

implies that $L_{a\gamma}(b\gamma) = L_{a\gamma}$. Let $x \in L_\alpha$ and want to show that

$x\gamma b \in L_\alpha$. From lemma 2.2 we know that $x\gamma \in L_{\alpha\gamma}$, and as $L_{a\gamma}(b\gamma) = L_{a\gamma}$, we get that $(x\gamma)(b\gamma) \in L_{a\gamma}$, hence $(x\gamma b\gamma)f^{S\Gamma}(a\gamma)$ and then lemma 2.2 implies $(x\gamma b)f^{S}a$, hence $x\gamma b \in L_\alpha$.

Conversely, let $x \in L_\alpha$, then

$x\gamma \in L_{\alpha\gamma} = L_{\alpha\gamma}(b\gamma)$.

So, $x\gamma = y(b\gamma)$ with $yf^{S\Gamma}(a\gamma)$, hence $y = a'\gamma$ where $a'f^{S}a$ from lemma 2.2. It follows that $x\gamma = a'\gamma b\gamma$ and after cancellation of γ, $x = a'\gamma b \in L_a\gamma b$ as desired. ∎

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SOME RELATIONSHIPS BETWEEN QUADRATIC RESIDUES AND QUADRATIC NONRESIDUES

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Abstract

We denote by $K(p)$ the set of quadratic residues modulo the odd prime p. The other elements $\not\equiv 0 \,(\mathrm{mod}\, p)$ called quadratic nonresidues $\mathrm{mod}\, p$ and their set is denoted by $J(p)$. In the following we firstly prove that $K(p) \cdot J(p) \subseteq J(p)$ and $J(p) \cdot J(p) \subseteq K(p)$. Secondly, we prove that when $p = 4k - 1$, if $a \in K(p)$ then $a^{\frac{p+1}{4}} \in K(p)$ and $-a^{\frac{p+1}{4}} \in J(p)$. Also,

it is shown that for every quadratic non-residue b_0, each of the elements of the set $K(p)$ can be coupled with only are element of the set $J(p)$, in such a way that their product is equal exactly to $a \,(\mathrm{mod}\, p)$.

Keywords: Prime number, quadratic residues, quadratic nonresidues.

1. Introduction and preliminaries

The quadratic residues have been studied since the XVII th-XVIIIth centuries by the greates names of mathematics of the time (Fermat, Euler, Lagrange, Legendre, etc.) but their first systematic exposition, along with the denomination (*quadratic residues*) are due to Gauss's *Disquisitiones Mathematicae*, at the begining of the XIX th century.

They are distinguished by the well-known Euler's Criterion which is completed by the Criterion on the quadratic non-residues (both shown at the Theorem 1.1 below).

Let *p* be a prime odd number.

Definition 1.1.*The integer $a \not\equiv 0 \,(\mathrm{mod}\, p)$ is called a quadratic residue* $\mathrm{mod}\, p$, *if there is any integer y, such that $y^2 \equiv a(\mathrm{mod}\, p)$. Any other*

integer $\not\equiv 0(\mathrm{mod}\, p)$ is called a quadratic nonresidue $\mathrm{mod}\, p$.

We denote by $\mathrm{K}(p)$ and $J(p)$ the set of quadratic residues and the set

of quadratic non residues, respectively. Obviously, we have $K(p) \cap J(p) = \emptyset$.

Theorem 1.1.(Euler'sCriterion) *Let p be a prime odd number. Than the following conditions hold:*

$$a \in \mathrm{K}(p) \;\Leftrightarrow\; a^{\frac{p-1}{2}} \equiv 1(\mathrm{mod}\, p), \, a \in J(p) \;\Leftrightarrow\; a^{\frac{p-1}{2}} \equiv -1(\mathrm{mod}\, p).$$

2. Main results

Let p be an odd prime; we denote by $\mathrm{K}(p)$ the set of quadratic

residues modulo p and by $J(p)$ the set of quadratic non-residues $\mathrm{mod}\, p$. The following Theorem gives their product: what happens when we multiply a quadratic residue by a quadratic non-residue and two quadratic nonresidues modulo the odd prime p.

Theorem 2.1.*For every prime odd number p the following inclusions hold:*

$$\mathrm{K}(p) \cdot J(p) \subseteq J(p) \;\; and \;\; J(p) \cdot J(p) \subseteq \mathrm{K}(p).$$

Proof.Let $a \in \mathrm{K}(p)$ and $b \in J(p)$. From the Euler's Criterion we get

$$a^{\frac{p-1}{2}} \equiv 1(\mathrm{mod}\, p), \; b^{\frac{p-1}{2}} \equiv -1(\mathrm{mod}\, p);$$

multiplying both sides:

$$(ab)^{\frac{p-1}{2}} \equiv a^{\frac{p-1}{2}} \cdot b^{\frac{p-1}{2}} \equiv 1 \cdot (-1) \equiv -1(mod\, p),$$

which means that $ab \in J(p)$.

Meanwhile, if $b, c \in J(p)$, from the Euler's Criterion we have

$$b^{\frac{p-1}{2}} \equiv b^{\frac{p-1}{2}} \equiv -1 \,(\mathrm{mod}\ p),$$

so:

$$(bc)^{\frac{p-1}{2}} \equiv b^{\frac{p-1}{2}} \cdot c^{\frac{p-1}{2}} \equiv (-1) \cdot (-1) \equiv 1 (mod\ p),$$

Than

$bc \in K(p)$. ∎

The following Theorem is a criterion for the quadratic residues and the quadratic nonresidues modulo primes p of the type $p = 4k - 1$.

Theorem 2.2. *Let the p be a prime of the form* $p = 4k - 1, k \in \mathbb{N}$. *If* $a \in K(p)$ *than*

$$a^{\frac{p+1}{4}} \in K(p) \quad and \quad -a^{\frac{p+1}{4}} \in J(p).$$

Proof. Firstly, p being of the form $p = 4k - 1$ yields $\dfrac{p-1}{2} = 2k - 1$ and

$\dfrac{p+1}{4} = k$. Then, Euler's Criterion for $a \in K(p)$ gives:

$$a^{2k-1} \equiv a^{\frac{p-1}{2}} \equiv 1 (mod\ p).$$

Than, for the number $a^{\frac{p+1}{4}} = a^k$ we have:

$$(a^k)^{\frac{p-1}{2}} = (a^k)^{2k-1} = a^{k(2k-1)} = (a^{2k-1})^k \equiv 1^k \equiv 1\ (mod\ p) ,$$

whereby $a^{\frac{p+1}{4}} \in K(p)$.

Analogusly, for the number $-a^{\frac{p+1}{4}} = -a^k$ we get:

$$(-a^k)^{\frac{p-1}{2}} = (-a^k)^{2k-1} = -a^{k(2k-1)} = -(a^{2k-1})^k \equiv -1^k \equiv -1\ (mod\ p) ,$$

which means that $-a^{\frac{p+1}{4}} \in J(p)$. ∎

Finally, by the following theorem we obtain the main result of this note, which shows that for every odd prime *p,* every quadratic residue modulo *p* can be coupled with only one quadratic non-residue in such a way that their product is exactly any pre-defined quadratic non-residue modulo the same *p*.

Theorem 2.3. *Let p be an odd prime, K(p), J(p) respectively the sets of quadratic and non-quadratic residues modulo p and b_0 an arbitrary element from J(p). Then for every element $k \in K(p)$ exists only one element $j \in J(p)$, such that their product $k \cdot j \bmod p$ is the element b_0*
.

Proof. Let congruence *a* be an arbitrary element of

K(p). Consider the

$ax \equiv b_0 \pmod{p}.$ (1)

That congruence has a unique solution, for $(a, p) = 1$. The integer a ha only one iverse $a'mod\ p$, so $aa' \equiv 1 \pmod p$. Multiplying both sides of the equation (1) by a', we get it's solution:
$x \equiv a'b_0 \pmod p$.

By Theorem 2.1, seeing that $aa' \equiv 1 \pmod p$ and $1, a \in K(p)$, we have

that $a' \in K(p)$. Also, because $b_0 \in J(p)$, using again Theorem 2.1 we

obtain that $a'b_0 \in J(p)$.

This way, the quadratic residue a is corresponded to the quadratic

nonresidue $a'b_0$, such that their product is the pre-defined quadratic non-residue $b_0\ mod\ p$.

What remains to prove is the uniqueness of the quadratic nonresidue such that its product with the quadratic residue a is the given quadratic non-residue $b_0 \pmod p$. Let us suppose the opposite, which is that there exists any $a \in K(p)$ and $b_1, b_2 \in J(p)$, such that:

$ab_1 \equiv b_0 \pmod p$ and $ab_2 \equiv b_0 \pmod p$.

Multiplying both the congruences by a' we have:
$b_1 \equiv b_2 \equiv a'b_0 \pmod p$,

so $b_1 \equiv b_2 \pmod p$. ∎

Let us illustrate this situation with an example for the prime $p = 13$. The sets of quadratic residues and quadratic non-residues modulo 13 are, respectively:

$K(13) = \{1, 3, 4, 9, 10, 12\}$ and $J(13) = \{2, 5, 6, 7, 8, 11\}$.

Resolving for each fixed $b_0 \in J(13)$ and $k \in K(13)$, the equation $j \cdot k \equiv b_0\ mod\ 13$, the (unique) solution $j \in J(13)$ is shown (in bold) in the following congruences:

1 · 2 ≡ 2 (mod13)   **1** · 5 ≡ 5 (mod13)   **1** · 6 ≡ 6 (mod13)

3 · 5 ≡ 2 (mod13)   **3** · 6 ≡ 5 (mod13)   **3** · 2 ≡ 6 (mod13)

4 · 7 ≡ 2 (mod13)   **4** · 11 ≡ 5 (mod13)   **4** · 8 ≡ 6 (mod13)

9 · 6 ≡ 2 (mod13)   **9** · 2 ≡ 5 (mod13)   **9** · 5 ≡ 6 (mod13)

10 · 8 ≡ 2 (mod13) **10** · 7 ≡ 5 (mod13) **10** · 11 ≡ 6 (mod13)

$\mathbf{12} \cdot 11 \equiv 2 \,(\mathrm{mod}\,13)$ $\mathbf{12} \cdot 8 \equiv 5 \,(\mathrm{mod}\,13)$ $\mathbf{12} \cdot 7 \equiv 6 \,(\mathrm{mod}\,13)$

$1 \cdot 7 \equiv 7 \,(\bmod 13)$

$3 \cdot 11 \equiv 7 \,(\bmod 13)$

$4 \cdot 5 \equiv 7 \,(\bmod 13)$

$9 \cdot 8 \equiv 7 \,(\bmod 13)$

$1 \cdot 8 \equiv 8 \,(\bmod 13)$ $1 \cdot 11 \equiv 11 \,(\bmod 13)$

$3 \cdot 7 \equiv 8 \,(\bmod 13)$ $3 \cdot 8 \equiv 11 \,(\bmod 13)$

$4 \cdot 2 \equiv 8 \,(\bmod 13)$ $4 \cdot 6 \equiv 11 \,(\bmod 13)$

$9 \cdot 11 \equiv 8 \,(\bmod 13)$ $9 \cdot 7 \equiv 11 \,(\bmod 13)$

$10 \cdot 2 \equiv 7 \,(\bmod 13)$ $10 \cdot 6 \equiv 8 \,(\bmod 13)$ $10 \cdot 5 \equiv 11 \,(\bmod 13)$

$12 \cdot 6 \equiv 7 \,(\bmod 13)$ $12 \cdot 5 \equiv 8 \,(\bmod 13)$ $12 \cdot 2 \equiv 11 \,(\bmod 13)$

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A STUDY ON AVERCH-JOHNSON EFFECT ON COBB – DOUGLAS MODEL, AS A PROBLEM OF CONDITIONAL OPTIMIZATION

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Abstract

In this paper we present an optimization model conditional on the economy. We are focused on Cobb – Douglas model, on which we will study the Averch-Johnson effect. For this build some files that use symbolic tools and Matlab techniques.

Keywords: Averch-Johnson effect, Cobb – Douglas model, parameter, profit.

1. Problem statement

A conditional optimization problem rains very often in economy. Generally, is of interest what happens to point of the goal function extremum when restrictive conditions are dependent on one or more system parameters, which vary in certain areas. In this project we will use numerical optimization methods to analyze a simplified model of the case sensitive and he represents the phenomenon known in literature as Averch-Johnson effect.

The revenue R that a company realizes from the sale of its products or services, under monopoly conditions, depends directly on the level of output z. A simplified model of the dependence $R=R(z)$ has the form

$$R(z) = \frac{c \cdot z^2}{1 + z^2}.$$

According to this model, the revenue R is the incremental function of z but tends asymptotically in c (maximum unit of revenue - for simplicity we are taking c=1) while production goes to market saturation. Production level z in turn depends on invested capital x and invested work y. A typical pattern of this dependence is the Cobb – Douglas model (see [2], [3]), according to which:

$$z(x, y) = K \cdot x^\alpha \cdot y^\beta$$

where we assume that $\alpha + \beta = 1$. We suppose for simplicity that $\alpha = \beta = 1/2$ and $K = 1$. Further we have the cost function for which we suppose that has the form:

$$C(x, y) = c_1 x + c_2 y,$$

where c_1 and c_2 are constants. In these conditions, the company profit would be calculated with the formula:

$$F(x, y) = R(z(x, y)) - C(x, y)$$

Finally we have the profit rate $h(x,y)$ which is calculated with the formula:

$$h(x, y) = \frac{R(z(x, y)) - c_2\, y}{x}$$

for which, different legislation places different restrictions of the form:

$$h(x, y) \le s$$

where the above parameter s, represents the allowed limit of profit. The smaller the value of s is the more stringent the restriction is denote by:

$$G_s = \{(x, y):\ h(x, y) \le s\}$$

Permit Area: set values of the couple (x-capital, y-labor-force) that produce an allowable profit rate. We mark by D the area of changing variables (x,y). We will study how changes the extremal point of area G_s which maximizes the profit of the company F, depending

on the allowed rate of profit s.

2. Mathematical calculation

We have:x- invested capital $(x > 0)$, y-invested work $(y > 0)$.

We take as a Purpose Function, the function:

$$\max F (x, y), \quad \begin{cases} h(x, y) \leq s \\ x, y > 0 \end{cases}. \tag{1}$$

First we write the function $F(x,y)$ in the form:

$$F(x, y) = \frac{xy}{1+ xy} - c_1 x - c_2 y. \tag{2}$$

Calculate the firstly partial derivatives of the function $F(x,y)$.

$$\begin{cases} F'_x(x, y) = \dfrac{y}{(1+ xy)^2} - c_1 \\ \\ F'_y(x, y) = \dfrac{x}{(1+ xy)^2} - c_2 \end{cases}. \tag{3}$$

From equations:

$$\begin{cases} F'_x(x, y) = 0 \\ F'_y(x, y) = 0 \end{cases} \Rightarrow \begin{cases} \dfrac{y}{(1+ xy)^2} = c_1 \\ \dfrac{x}{(1+ xy)^2} = c_2 \end{cases}. \tag{4}$$

So, here, we would find the critical point, depending on the coefficients c_1, c_2 .

3. Coefficients c_1 and c_2 indefinite

In general, each company has concrete c_1 and c_2 values to the cost function, but we are initially handling the general case. From equation (4) we have the estimation of coefficients c_1 and c_2 (as the critical point of the profit function).We need to define an area D (rectangular) for values of variables X and Y (certainly in this area the variables: X-labor-force and Y-capital, can be taken bigger than the predictions or the possibility of the firm or company to cope), and in this area D we will try to find a local maximum of the function$F(x,y)$. (But we can have that, this function $F(x,y)$ not to have maximum in the

area D, in this case we will refer to the greater value of this functionin D-area, always in accordance with the conditions we will have.) This

can be done with Matlab software techniques (see [5]). If we would choose Newton's method of optimization method we need an approximation, beginner, pleasing to the maximum, which cannot be found, or it is assumed, surely, despite the concrete context of the problem.To find a safe initial approximation we are making a graphical representation of the profit function $F(x,y)$ as well as its contour map in D-area.

We are constructed the following file who uses Matlab's symbolic tools and techniques:

```
syms xy
z=(x^.5)*(y^.5);
revenue=(z^2)/(1+z^2);
c1=y/(1+x*y)^2;
c2=x/(1+x*y)^2;
kosto=c1*x+c2*y;
profit=revenue-kosto;
ezsurf(profit, [0 10 0 40]);
view(10,40);
title ('F(x, y) – The company"s profit')
xlabel('X - Capital')
ylabel ('Y - Labor Force')
```

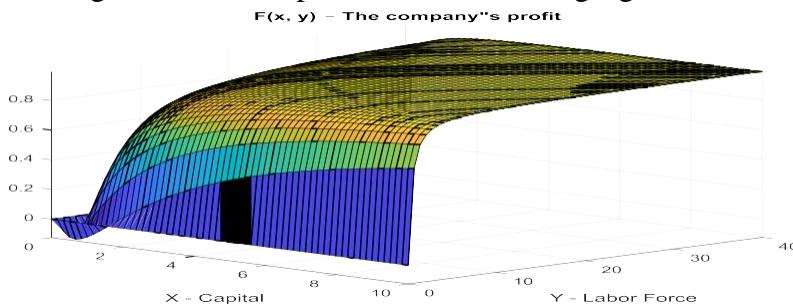Executing the above file produces the following figure

Figure 1. F (x, y) - Company Profit where the coefficients c_1 and c_2 to the cost function are indefinite.

We are also constrict the *contour map* of the profit function that the company realizes.

```
syms xy
z=(x^.5)*(y^.5);
revenue=(z^2)/(1+z^2);
```

```
c1=y/(1+x*y)^2;
c2=x/(1+x*y)^2;
cost=c1*x+c2*y;
profit=revenue-cost;
ezcontour(profit, [0 10 0 10]);
view(10,40);
title ('Contour MAP of profit
which the company realizes')
xlabel('X - Capital')
ylabel ('Y - Labor Force')
```

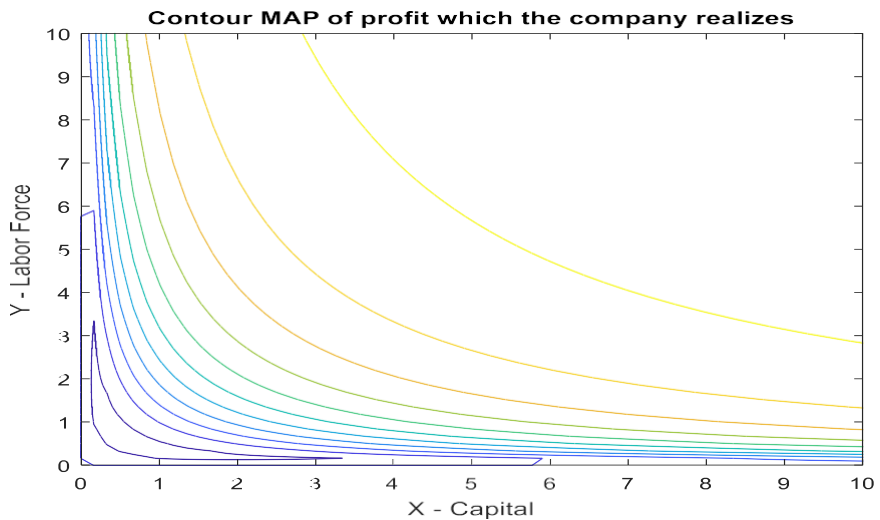Executing the above code produces the following figure

Figure 2. The contour map of the function F (x, y) for c1 and c2 are indefinite.

Case 1. If we find an initial approximation (x^{**}, y^{**}) of the maximum point, we apply Newton's Method (or any of the other conditional optimization methods). Some steps of the Newton method will be sufficient to ascertain the convergence of the process and to compute (x^{**}, y^{**}) with some exact digits, and at this point we would find Profit_max (x^{**}, y^{**}). To proceed further, we are constructing the contour map of the function $h(x,y)$ associating it with the map of directions of grad_$h(x,y)$.

The following Matlab code represents the *contour map* of the Profit Rate $h(x,y)$.

```
profit=revenue-cost;
norm=profit/x+c1;
ezcontour(norma, [1 6 1 6])
view, [10, 40]
title ('Contour MAP of profit rate h(x,y)')
xlabel('X - Capital')
ylabel ('Y - Labor Force')
```

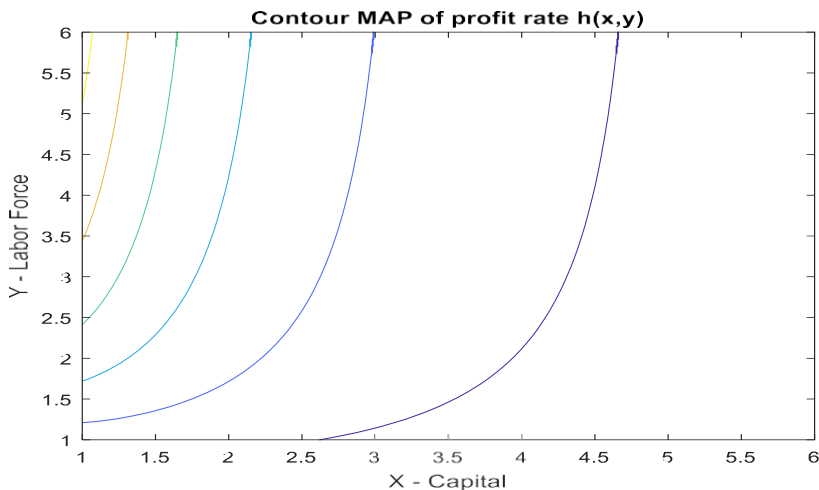Executing the above code produces the following figure:

Figure 3. The the contour map, the profit rate, $h(x,y)$, when coefficients c1 and c2 are indefinite.

We are also giving a 3D view of the surface for the profit rate $h(x, y)$.

```
norm=profit/x+c1;
ezsurf(norma, [0 6 0 4])
view, [10, 40]
title ('Profit Rate h(x,y)')
xlabel('X - Capital')
ylabel ('Y - Labor Forc')
```
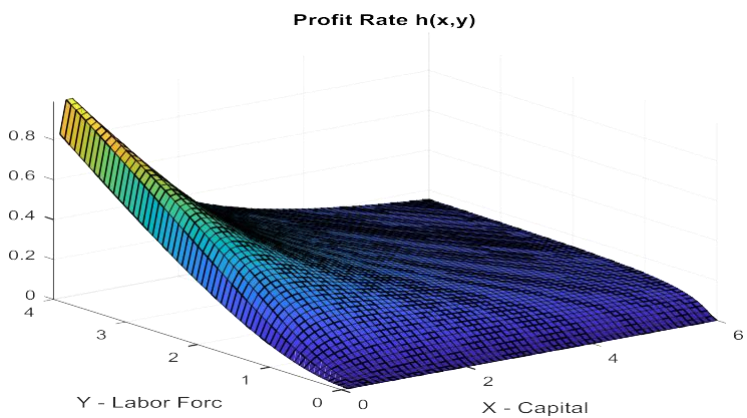
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Profit Rate h(x,y)

Figure 4. The 3D-graph of, the profit rate, $h(x,y)$, when coefficients c1 and c2 are indefinite.

We need to calculate the level s^{**} which corresponds to the optimal point (x^{**}, y^{**}) where the function is $\max\{F(x,y)\}$. Over-placed the optimal point (x^{**}, y^{**}) as well as the level line in s^{**} of the function $h(x,y)$, in the contour map to constructed. It's obvious that the area G_s for $s \geq s^{**}$ would contain the optimal point (x^{**}, y^{**}), (because this is our limitation, in this area requires optimal value, which as we said above can be an extremum or simply the greatest value of the profit function $F(x, y)$), so the maximum profit of the company in the area G_s (thus $\max\{F(x,y) \mid h(x,y) \leq s\}$) would be realized at the point (x^{**}, y^{**}).

Meanwhile, when $s < s^{**}$ the maximum of the company's profit in the area G_s is realized in the contour $h(x,y)=s$. Therefore, the problem would be formulated, equally. To maximize the function:

$$\max\{F(x,y)\}, \quad \begin{cases} h(x,y) = s, \\ s < s^{**}. \end{cases} \tag{5}$$

The respective equations of Lagrange are:

$$\begin{cases} F'_x(x,y) = \lambda \cdot h'_x(x,y) \\ F'_y(x,y) = \lambda \cdot h'_y(x,y) \\ h(x,y) = s \end{cases} \tag{6}$$

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For as much as $h'_y = F'_y / x$, then, the second equation above is reduced to the form $(1-\lambda / x)F'_y = 0$. It can be proven that $0 < \lambda / x < 1$, so the equations that determine the solution (x, y) of equations (6) are reduced in the form:

$$F'_y(x, y) = 0, h(x, y) = s \qquad (6')$$

Below we are constructed the contour map of d$F(x,y)$ /dy.
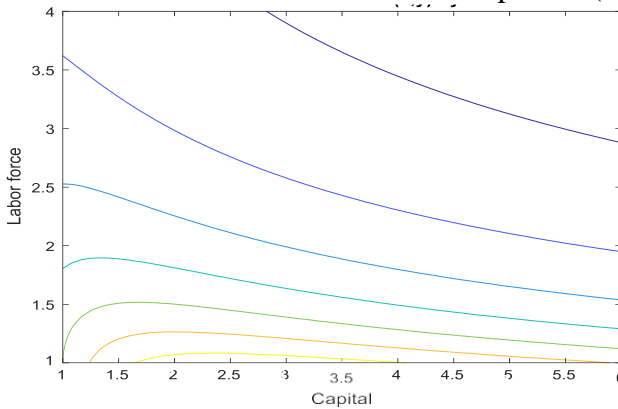
Figura 5: The Level Line for d$F(x,y)$/dy - Company Profit When Coefficients c1 and c2 are indefinite.

Full Map for Averch-Johnson Effect Study (see [1], [5]) would be derived from the overlapping of the profit rate mapping with the constructed contour line for profit = d$F(x,y)$ /dy = 0, cutting points of these contour maps would produce points for critical level s^{**}.
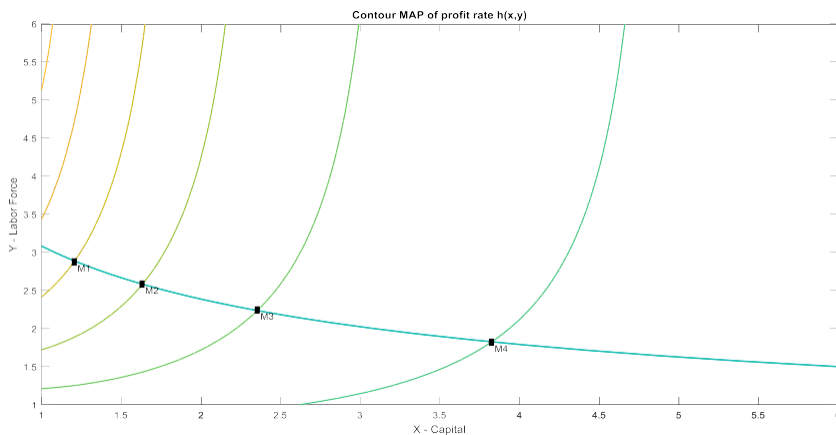

Figure 6: Full map, to study the effect Averch-Johnson.

The level of allowed profit rate s^{**} we can consider it as a critical level.

a) If the rules set the upper limit of the profit rate the level $s \geq s^{**}$, then this restriction does not affect the maximum profit of the company, which achieved the point $\left(x^{**}, y^{**}\right)$.

b) If, $s < s^{**}$ then the company's maximum profit depends on 's' and the optimal capital-workout parameters are calculated graphically as a cutting points of two respective lines:

$F_y'(x, y) = 0$ and $h(x, y) = s$.

The above conclusion should be in fact the attention of the policies and bodies that regulate the profit rate, since the uncontrolled reduction of this norm objectively reduces the labor-force.

A pleasing compromise it could be setting a level of profit rate near the critical level s^{**}, on his left.

Case 2. We do not have any initial approximation, then we refer to the highest value it receivesfunction $F(x,y)$ in Darea. From the unspecificity, or from other certain values of coefficients c_1 and c_2, can bring us that the profit function $F(x,y)$ does not have extremes in the G_S area, but for us would suffice the greatest value of this function in this area, so we would have a value max$F(x,y)$ satisfying for our conditions.The non-determination of coefficients c_1 and c_2 allows us to study the problem theoretically.Certainly, every company has a clear function of the cost $C(x,y)$, so it also has clear the values of c_1 and c_2 coefficients of this model.

It can also be discussed for: coefficient values c, to the revenu function R, value for the cefficients K and α, β where (α, β), there is a condition that $\alpha + \beta = 1$, to the Cobb –Douglas function $z(x,y)$ (see [2], [3], [4]), unlike the study conducted in Case.1, here would be added the actions by bringing a little analytical difficulty to the mathematical apparatus (symbolism) but this would not be a problem for Matlab software.

In this case the role of s^{**} is the greatest value which takes the function $F(x,y)$ and in the role of the optimal point (x^{**}, y^{**}) will be the point where achieved the greatest value of this function.

The results of this case will be the same as in Case 1, a) and b).

4. Case when coefficients c_1 and c_2 are definited

At this point of our work, we are concretizing the above work, with the help of Matlab software and giving you two values of the coefficients $c_1=2/49$, and $c_2=3/49$.

First let's try to find a local maximum of the function $F(x, y)$ in the permitted area D of the variables x and y.

For concretization we assume that the D area is the rectangle $x=1$, $x=6$, $y=1$, $y=4$. If we were to choose Newton's method of optimization, we needed a satisfactory initial approximation for the maximum, which can not be safely assumed or assumed, despite the concrete context of the problem. To find a safe initial approximation we are making a graphical representation of the profit function $F(x,y)$ as well as its contour map in the area D.

We are construct the following file that uses the symbolic tools and Matlab techniques (see [5]):

```
syms xy
z=(x^.5)*(y^.5);
revenue =(z^2)/(1+z^2);
cost =0.04*x+0.06*y;
profit = revenue- cost;
ezsurf(profit, [0 6 0 4]);
view(10,40);
figure;
ezcontour(profit, [0 11 0 14]);
view(10,40);
title ('F(x, y) – The company"s profit')
xlabel('X - Capital')
ylabel ('Y - Labor Force')
```

The execution of the above code produces the following two figures
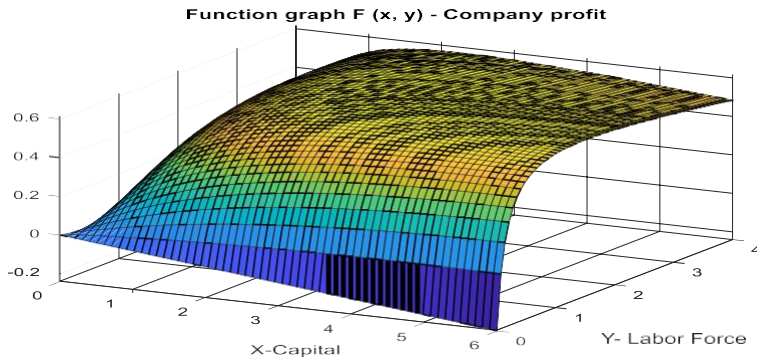
Figura 7: The profit function of the company F (x, y) when c1 = 2/49 (= 0.04) and c2 = 3/49 (= 0.06).
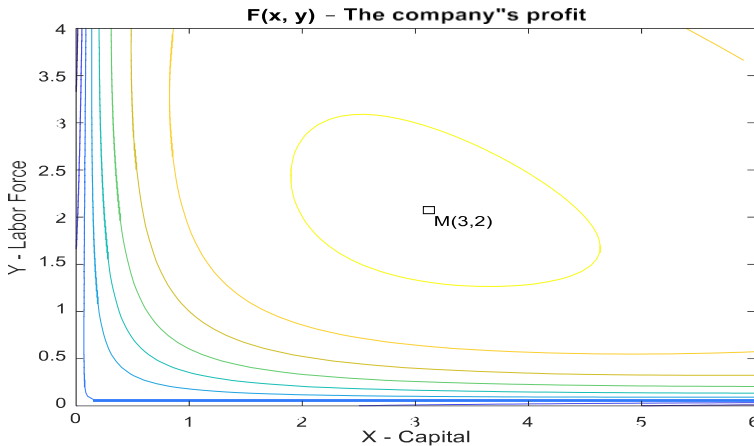
Figura 8: The contour map of the profit function of the company F (x, y).

From the figure (8) we can directly read an initial approximation of the maximum point (x*,y*)which is point M (3,2). Only 4-5 steps of the Newton method are sufficient to ascertain the convergence of the process and to compute (x *, y *) with some correct figures. This does the following Matlab file:

%This file performs 5 steps of the Newton method for finding the maximum of the function F (x, y) - the profit of the company.
syms xy% declare, the symbolic variables x and y
I=[2.0 3.0]'; %Initialize, initial approximation of the maximum
format long

[H,gradf]=hes_grad(x,y); %computes Hesian Matixs H and gradf gradient of function f
for j=1:5
   HN=subs(H,[x,y],[I(1),I(2)]);
   gradfN=subs(gradf,[x,y],[I(1),I(2)]);
   I=I-inv(HN)*gradfN;
   disp(I')
end
Norma_profitt_max= profit_ norm(I(1),I(2)).
function [H,gradf]=hes_grad(x,y)
syms xy
fx=diff(profits,x);
fy=diff(profits,y);
gradf=[fx fy]';
fxx=diff(fx,x);
fxy=diff(fx,y);
fyy=diff(fy,y);
H(1,1)=fxx; H(1,2)=fxy; H(2,1)=H(1,2); H(2,2)=fyy;
After executing the file njuton.m these results are obtained:

x	y
3.0	2.0
3.024705882352941	2.016470588235294
3.025018414771728	2.016678943181152
3.025018463853792	2.016678975902528
3.025018463853793	2.016678975902529
3.025018463853793	2.016678975902529

$x^* = 3.025018463853793$ $y^* = 2.016678975902529$
Profit_max(x^*,y^*) = 0.617163194659186

To proceed further, we are constructed the contour map of the function $h(x,y)$ accompanied by the map of directions grad h(x,y). For concretization we are choosing the following 4 levels for s:
levels = [0.40 0.30 0.20 0.15]
By observing the map of figure (9) we notice that for the given level **s**, the area G_s located on the right of the contour line, the level s (for this, helps us maps of directions, grad $h(x,y)$)

Calculate the level s^* which corresponds to the optimal point (x^*, y^*) which we found above with the njuton.mfile :

$$s^* = h(x^*, y^*) = 0.244019650358108 \approx 0.244.$$

Over-placed the optimal point (x^*, y^*) as well as the level line in s^* of the function $h(x, y)$, in the contour map to constructed.

It's obvious that the area G_s for $s \geq s^*$ would contain the optimal point (x^*, y^*), so the maximum profit of the company in the area G_s (thus $\max\{F(x, y) \mid h(x, y) \leq s\}$) would be realized at the point (x^*, y^*). Meanwhile, when $s < s^*$ the maximum of the company's profit in the area G_s is realized in the contour $h(x, y) = s$. As in point 2, here too the problem is formulated the same form; To maximize the function:

$$\max\{F(x, y)\}, \quad \begin{cases} h(x, y) = s, \\ s < s^*. \end{cases} \tag{7}$$

Write the corresponding Lagrange equations:

$$\begin{cases} F'_x(x, y) = \lambda \cdot h'_x(x, y) \\ F'_y(x, y) = \lambda \cdot h'_y(x, y) \\ h(x, y) = s \end{cases} \tag{8}$$

For as much as $h'_y = F'/x$, then, the second equation above is reduced to the form $(1 - \lambda/x)F'_y = 0$. It can be proven that $0 < \lambda/x < 1$, so the equations that determine the solution (x, y) of equations (8) are reduced in the form:

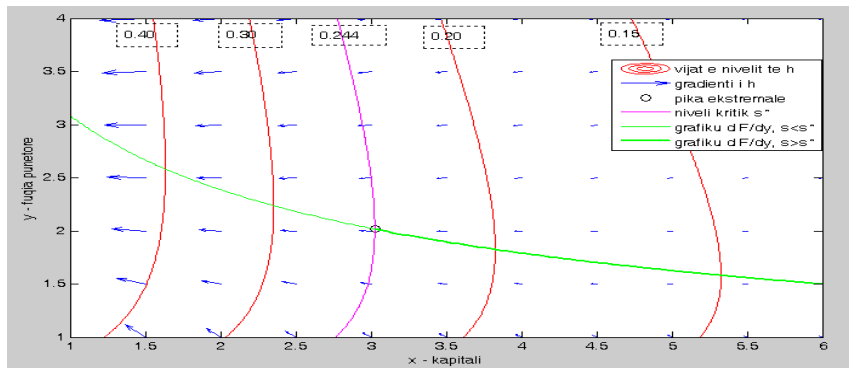$$F'_y(x, y) = 0, h(x, y) = s \tag{8'}$$

Figura 9: Full map for the study of Averch-Johnson effect.

In figure (9) it is superimposed (green colored for $s \geq s^*$ and bold for $s < s^*$) the zero-level line of the function $F_y'(x, y)$. Precisely the bold

part of this line graphically represents the performance of the extreme point that maximizes the profit of the company $F(x, y)$, depending on the allowed profit rate s.

The level of allowed profit rate s^* we can consider it as a critical level. If the rules set the upper limit of the profit rate the level $s \geq s^*$, then this restriction does not affect the maximum profit of the company that is in the point (x^*, y^*). If, $s < s^*$ then the company's maximum profit depends on the value s and the optimal parameters, the capital-labor force are graphically calculated as the cutting points of the two contour lines: $F_y'(x, y) = 0$ and $h(x, y) = s$.

Conclusion .*In particular, we can see from the chart (9) that, with the reduction of the profit rate, the company needs to increase capital and reduce labor costs in order to maximize its profits.*

The above conclusion must be, in fact, in mind policies and bodies which regulate the profit rate,since the uncontrolled reduction of this norm with objectively reducing the labor-force. A pleasant compromise could be to set a level of profit rate close to the critical level s^*, on his left.

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SOME RESULTS FROM DESIGN THEORY

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Abstract

In this paper, we will discuss some of the basic results from design theory. In the introduction to this paper, we will present the meaning of the incidence structure, affine plane, projective plane and finite incidence structure, finite affine plane, finite projective planes illustrated with different examples. The main focus will be the study and discussion mainly of symmetric designs and the construction of Steiner ternary systems, as a function of three parameters in an incidence structure, but not only, where we will bring some different examples for symmetric designs, even for non-symmetric designs. Also we will see the relationship between, that the finite affine plane and finite projective plane with Steiner ternary systems. In this paper we will make a discussion on Hadamard designs, and, Hadamard matrices, we show that the Hadamard matrices of order at least eight and Hadamard designs are equivalent mathematical objects.
MSC 2010:51Axx, 51Exx, 05Bxx, 51A45, 51E30, 05B05, 05B30, 51E05, 05B07, 05B20.

Keywords: incidence structure, designs, Steiner ternary systems, Hadamard designs.

1. Introduction and preliminaries

An incidence structure consists simply of a set P of points and a set B of blocks, with a relation of incidence between points and blocks. Being of such a general nature, incidence structures arise naturally in all branches of mathematics (see [5]-[9]).
Let be P, D non-empty set, and subset I to Cartesian product $P \times D$.

Definition 1.1. *The incidence Structure called the triple* $S = (P, D, I)$

where $P \cap D = \varnothing$ *and* $I \subseteq P \times D$.

Let us be two incidence structures $S=(P,D,I)$ and $S'=(P',D',I')$.

Definition 1.2. *Anisomorphism from* $S=(P,D,I)$ *to* $S'=(P',D',I')$.

Is a pair of bijections $P \to P'$ *and* $D \to D'$, *which preserves incidence.*

It is natural to assume that P and D are disjoint
(similarly P' and D')so that any such pair of bijections can be

considered as a single bijection. Let us say exactly what we mean by
an isomorphism, in this setting:

An isomorphism from $S=(P,D,I)$ *to* $S'=(P',D',I')$. is a bijection

$\sigma : (P,D,I) \to (P',D',I')$,

such that

   a)$\sigma(P) = P'$ *and*$\sigma(D) = D'$, *and*

   b)$\forall P \in P$ and $\ell \in D$, we have $\forall (P,\ell) \in I \Rightarrow (\sigma(P), \sigma(\ell)) \in I'$.

An isomorphism from $S=(P,D,I)$ *to itself is called an* **automorphism**
in S.

The set of all automorphisms will be marked with $Aut(S)$ or
$Aut(P,D,I)$, which is a group about composing.

Definition 1.3.*An incidence structure* $S=(P,D,I)$*will be called*
configuration *if:*

   a)Every two different points are incidents, mostly one block.
   b)Every two different blocks are incidents, mostly, with one point.

Definition 1.4.*Incidence Structure* $S'=(P',D',I')$ *called substructure*
of structure $S=(P,D,I)$ *if* $P' \subseteq P, D' \subseteq D$ and $I' = I \cap P' \times D'$.

Definition 1.5. *An incident structure* $S=(P,D,I)$*will be called finite*

if $card\left(P\right)$ *is a finite number.*

Definition 1.6.*An incident structure* $S^{*}=\left(P^{*},D^{*},I^{*}\right)$ *will be called a*

dual structure of the structure $S=\left(P,D,I\right),$ *if we have*
$P^{'}\subseteq P$, $D^{'}\subseteq D$ and $I^{'}=\left\{\left(b,P\right)\in P^{'}\times D^{'}\mid\left(P,b\right)\in I\right\}.$

Proposition 1.1. (The principle of duality) For a class K, *of the incidence structures we mark with:* $K^* = \left\{ S^* \mid \exists S \in K, S = S^* \right\}$.

1. *If **A** is a statement that applies to all structures* $S \in K$, *then* A^* *applies to all structures of* K^*.

2. *If* $K^* = K$,*then if claim **A** is valid for* K, *even the dual* A^* *statement will apply for* K^*.

Definition 1.7.*A **partial linear space** is a incidence structure satisfying the axioms:*

p.L.S.1*Any two distinct points lie on at most one common line.*

p.L.S.2*Every line has at least two points.*

Definition 1.8. *A **linear space** is a incidence structure satisfying the stronger conditions:*

L.S.1 *Any two distinct points lie on exactly one common line.*

L.S.2 *Every line has at least two points.*

Finite incidence structures are usually associated with the incidence matrix by taking into account the correspondence of the points and lines with the rows and matrix columns as the case may be. The incidence matrix has only elements 0 and 1, 0 when there is no incidence between points and lines and 1 in case we have.

2. Design and Steiner system

Let *m*, *n*, *q* and *p* be nonnegative integers satisfying $m \geq n \geq q$.(see [1]-[4])

Definition 2.1. *A finite incidence structure* $S = \left(P, B, I \right)$ *is called aq-*

***design**with parameters (m,n,p), or shortly a* $D^S \left(q, [m, n, p] \right)$, *if the following properties are satisfied:*

    D.1. S *contains exactly m-points.*

    D.2. $B \neq \emptyset$ *and every block of* S *is incident with exactlyn* ≥ 2 *points.*

    D.3. *Everyq-distinct points of* S *are incident exactly with **p**-block.*

    D.4. *If B₁and B₂are two distinct block in* B *of* S , *then*

    $\{X \in P \mid X \in B_1\} \neq \{X \in P \mid X \in B_2\}$.

Theorem 2.1 *Any* $D^S \left(q, [m, n, p] \right)$ *is also an* $D^S \left(s, [m, n, p] \right)$ *for*

every $s \in \{1, 2, ..., q\}$.

*Proof.*Suppose $S = (P, B, I)$ is a $D^S(q, [m, n, p])$. Let $s \in \{1, 2, ..., q\}$ and let X be an arbitrary subset of $X \subseteq P$ that $|X| = s$. We count in two different ways the number of pairs (Y, B), where Y is a subset of P, *that* $|Y| = q$ containing X and B is a block in Y. There are

$C(m - s, q - s)$ possibilities for Y and for given Y are the *p*-possibilities for B. Hence, the total number of suitable pairs is equal to $C(m - s, q - s) \cdot p$. If p_X denotes the total number of blocks containing X, then the total number of suitable pairs is also equal to $p_X \cdot C(n - s, q - s)$. Hence, p_X is independent from the chosen subset X such that $|X| = s$ and equals

$$p_S = \frac{C(m - s, q - s)}{C(n - s, q - s)} \cdot p.$$

So, the incidence structure S is $D^S(s, [m, n, p_S])$.

Proposition 2.2 *Every point of a* $D^S(q, [m, n, p])$ *is incident with the same number of blocks.*

Proof. Each point is the set of an element, from the above proof, we get s = 1, it is easy to show.

Definition 2.2. A $D^S(q, [m, n, 1])$ *called a **Steiner system** and is often marked by* S[q,n,m].

This notation is sometimes extended to $S(p, [q, n, m])$ for $D^S(q, [m, n, p])$.

Definition 2.3. A $D^S(q, [m, 3, 1])$ *called a **Steiner triple system**.*

3. TheSteiner system and finite projective plane

Definition 3.1. *A **projective plane** is an incidence structure* $S = (P, B, I)$, *where* P *is a set of elements called points,* L *is a subset of* 2^P *called lines, and* I *is an incidence relation between points and lines such that the following holds*:

Pr.1.*For any two distinct points, there is exactly one line through both.*

Pr.2._Any two distinct lines meet in exactly one point._
Pr.3._There exist four points such that no three are collinear._
A projective plane is called finite, if P is a finite set.

Proposition 3.1. _In an finite projective plane_ $S_P = (P, L, I\ )$ _every line contains the same number of points and each point passes through the same number of line. Furthermore, exists the natural number_ **m** $\hat{I}$ **¥** (**m t 2**) _of which are true following propositions:_

1) _In every line_ $1\ \hat{I}$ _L, the number of incidents points with him is exactly_ $m+1$.

2) _For every point_ **P** $\hat{I}$ P _, there are exactly_ $m+1$ _lines incidents with him._

3) The projective plane S_p _contains exactly_ $m^2 + m + 1$ _points._

4)_The projective plane_ S_p _contains exactly_ $m^2 + m + 1$ _lines._

The number **n** called order of the projective plane $S_P = (P_P, L_P, I\ )$.

Theorem 3.2 _The Steiner systems of type_ $S[2, n+1, n^2 + n+1]$, _for_ $n \geq 2$, _are exactly the projective planes of order n._

Proof. Suppose that the incidence structure $S_P = (P_P, L_P, I\ )$ is a projective plane of order $n \geq 2$. Then, by Proposition 3.1, for S_p we

have: $|P_P| = n^2 + n + 1$ points, $\forall$ $\ell \in L_P,\ |\ell| = n + 1$ points, and every

two distinct points are contained in exactly one line. So, in these conditions, the projective plane $S_P = (P_P, L_P, I\ )$ is a Steiner system of type $S[2, n+1, n^2 + n+1]$. Conversely, suppose that the incidence

structure $S_P = (P_P, L_P, I\ )$ is a Steiner system of type

$S[2, n+1, n^2 + n+1]$, for $n \geq 2$. Then S_p is a linear space in which

every line is incident with exactly $n+1$ points. In order to prove that

the incidence structure S_P is a projective plane of order n, it remains

to prove that every two distinct lines of L_P meet. Since P_P has $n^2 + n + 1$ points and every line $\ell \in L_P$ contains exactly $n+1$ points, there are

exactly $\dfrac{n^2 + n + 1}{(n+1) - 1} = n + 1$ lines through each point. Now, we take two

distinct lines ℓ_1 and ℓ_2 in L_P and let an point $P \in P_P$ that $P \in \ell_2$ and

$P \notin \ell_1$. Since ℓ_1 has $n+1$ points, there are $n+1$ lines with L_P that passes through the points $P \in P_P$ which meeting the line $\ell_1 \in L_P$. Since these are all the lines that pass through the point $P \in P_P$, then the lines ℓ_1 and ℓ_2 have to meet. This implies that incidence structure $S_P = (P_P, L_P, I)$ is a projective plane of order n.

4. The Steiner system and finite affine plane

Definition 4.1.*Affine plane called the incidence structure* $S_A = (P_A, L_A, I)$ *that satisfies the following axioms:*

Aff.1: *For every two different points P and $Q \in P_A$, there exists exactly one line $\ell \in L_A$ incident with that points.*

Aff.2: *For a point $P \in P_A$, and an line $\ell \in L_A$ such that $P \notin \ell$, there exists one and only one line $r \in L_A$, incident with point P and such that $\ell \cap r = \varnothing$.*

Aff.3: *In P_A there are three non-incident points with a line in L_A.*

An affine plane $S_A = (P_A, L_A, I)$, that there are a natural number of points will be called finite affine plane (see [4]-[9]).

Proposition 4.1*In an finite affine plane $S_A = (P_A, L_A, I)$ every line contains the same number of points and each point passes through the same number of line. Furthermore, exists the natural number $n \in N$, and $n \geq 2$ of which are true following propositions:*

1) In every line $\ell \in L_A$, the number of incidents points with him is n.

2) For every point $P \in P_A$, there are $n+1$ lines incidents with to.

3) The affine plane $S_A = (P_A, L_A, I)$ has n^2 points.

4) The affine plane $S_A = (P_A, L_A, I)$ has $n \cdot (n+1)$ lines.

The number n in the Propositions 4.1 called order of the affine plane $S_A = (P_A, L_A, I)$.

Proposition 4.2*In an affine plane $S_A = (P_A, L_A, I)$ with order n, there are $n+1$ the equivalence classes by parallelism of lines and each of which has n-lines.*

Theorem 4.3 *The Steiner systems of type* $S\left[2,\, n,\, n^2\right]$, *for* $n \geq 2$, *is exactly the affine planes of order n.*

Proof. Suppose that the incidence structure $S_A = \left(P_A, L_A, I\right)$ is an affine plane of order $n \geq 2$. Then S_A has exactly n points $\left(\left|P_A\right| = n_2\right)$, every line contains exactly n points and every two distinct points are contained in exactly one line. So, in these conditions, the incidence structure S_A is a Steiner system of type $S\left[2,\, n,\, n^2\right]$.

Conversely, suppose that the incidence structure S_A is a Steiner system of type $S\left[2,\, n,\, n^2\right]$, *for* $n \geq 2$. Then, the incidence structure S_A is a linear space, every line of which is incident with exactly n points. Since S_A has n^2 points and every line contains n points, every point of S_A is incident with exactly $\dfrac{n^2 - 1}{n - 1} = n + 1$ lines. Since $n + 1 \geq 2$, this implies that there exist three non-collinear points. Let them be right now $P \in P_A$ and $\ell \in L_A$ such that $P \notin \ell$. Since the line ℓ contains $\boldsymbol{n}$ points, then has exactly $\boldsymbol{n}$ lines that pass through the point P and meeting the line ℓ. But every point of S_A is incident with exactly $n+1$-lines, hence, there exists a unique line that pass through the point P and not-meeting this line ℓ.

Example A $\mathsf{D}^{\mathsf{S}}\left(2, [9, 3, 1]\right)$ *(Steiner triple system) is the affine plane of order 3.*

$\mathbf{P} = \left\{1, 2, 3, 4, 5, 6, 7, 8, 9\right\}$ -*Set of points.*

And set of lines (or block)

$\mathbf{L} = \left\{1_1, 1_2, 1_3, 1_4, 1_5, 1_6, 1_7, 1_8, 1_9, 1_{10}, 1_{11}, 1_{12}\right\}$
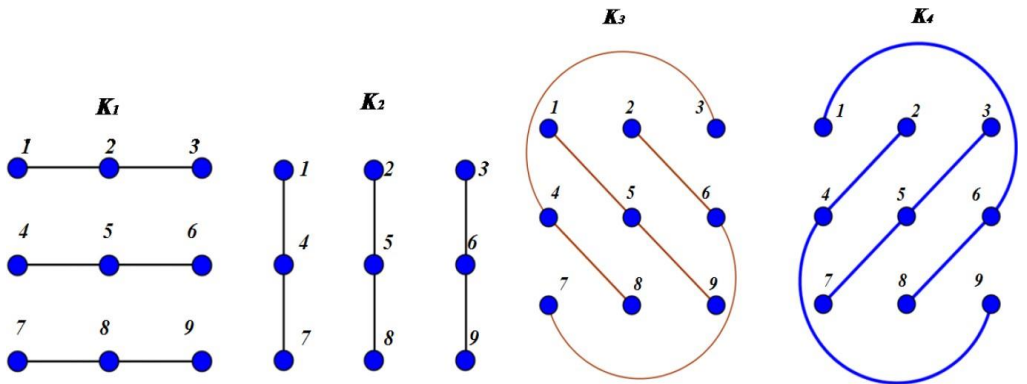
where

$1_1 = \{1, 2, 3\}; 1_2 = \{4, 5, 6\}; 1_3 = \{7, 8, 9\}; 1_4 = \{1, 4, 7\}; 1_5 = \{2, 5, 8\}; 1_6 = \{3, 6, 9\};$

$1_7 = \{1, 5, 9\}; 1_8 = \{2, 6, 7\}; 1_9 = \{3, 4, 8\}; 1_{10} = \{1, 6, 8\}; 1_{11} = \{2, 4, 9\}; 1_{12} = \{3, 5, 7\}.$
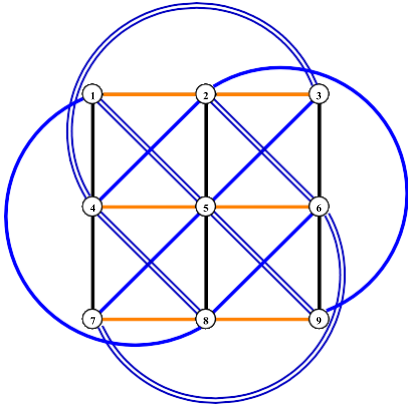
In this example we have four equivalence classes of parallel lines:

$$K_1 = \left\{1_1, 1_2, 1_3\right\}; K_2 = \left\{1_4, 1_5, 1_6\right\}; K_3 = \left\{1_7, 1_8, 1_9\right\}; K_4 = \left\{1_{10}, 1_{11}, 1_{12}\right\};$$

Itsis clear that these four classes are partition of the figure.

5. The special case $D^S\left(2,[m, n, p]\right)$

Theorem 5.1. *Let it the incidence structure* $S = (P, B, I)$ *be a*

$D^S\left(2,[m, n, p]\right)$, *let* **r** *denote the constant number of blocks through a given point of* S *and let* **M** *an incidence matrix of* S . *Then*
$\mathbf{M} \cdot \mathbf{M}^T = (r - p) \cdot \mathbf{I} + p \cdot \mathbf{J},$ *where* **I** *is the* $m \times m$ *-identity matrix and*

J *is the* $m \times m$-matrix with all entries equal to 1. *We have*

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$$\det\left(\mathbf{M}\cdot\mathbf{M}^{T}\right)=\left[r+(m-1)p\right]\cdot(r-p)^{m-1}.$$

*Proof.*Suppose **M** is the incidence matrix of S with respect to the ordering of points $(P_1, P_2, \ldots, P_m)$ and the ordering of blocks $(B_1, B_2, \ldots, B_n)$, where $n = |B_b|$. The (i, j) entry of the matrix $\mathbf{M} \cdot \mathbf{M}^T$

is equal to $\sum_{k=1}^{n} \mathbf{M}_{ik} \cdot \mathbf{M}_{jk}$, which is the total number of blocks through

the points P_i and P_j. So, this number is equal to r if $P_i = P_j$ and equal

to p otherwise. Hence,
$\mathbf{M} \cdot \mathbf{M}^T = (r - p) \cdot \mathbf{I} + p \cdot \mathbf{J}$.
Thus

$$\mathbf{M} \cdot \mathbf{M}^T = (r-p)\mathbf{I} + p\mathbf{J} = (r-p)\begin{pmatrix} 1 & 0 & 0 & \cdots & 0 \\ 0 & 1 & 0 & \cdots & 0 \\ 0 & 0 & 1 & \cdots & 0 \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & 0 & \cdots & 1 \end{pmatrix} + p\begin{pmatrix} 1 & 1 & 1 & \cdots & 1 \\ 1 & 1 & 1 & \cdots & 1 \\ 1 & 1 & 1 & \cdots & 1 \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ 1 & 1 & 1 & \cdots & 1 \end{pmatrix}$$

$$\mathbf{M} \cdot \mathbf{M}^T = \begin{pmatrix} r-p & 0 & 0 & \cdots & 0 \\ 0 & r-p & 0 & \cdots & 0 \\ 0 & 0 & r-p & \cdots & 0 \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & 0 & & \cdots & r-p \end{pmatrix} + \begin{pmatrix} p & p & p & \cdots & p \\ p & p & p & \cdots & p \\ p & p & p & \cdots & p \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ p & p & p & \cdots & p \end{pmatrix} = \begin{pmatrix} r & p & p & \cdots & p \\ p & r & p & \cdots & p \\ p & p & r & \cdots & p \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ p & p & p & \cdots & r \end{pmatrix}$$

$$\xrightarrow{R_i - R_1, \forall i = \overline{2,m}} \begin{pmatrix} r & p & p & \cdots & p \\ p-r & r-p & 0 & \cdots & 0 \\ p-r & 0 & r-p & \cdots & 0 \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ p-r & 0 & 0 & & r-p \\ & & & \cdots & \end{pmatrix} \xrightarrow{C_1 + \sum_{i=2}^{m} C_i}$$

$$\mathbf{M} \cdot \mathbf{M}^T = \begin{pmatrix} r+(m-1)p & p & p & \cdots & p \\ 0 & r-p & 0 & \cdots & 0 \\ 0 & 0 & r-p & \cdots & 0 \\ \vdots & \vdots & \vdots & \ddots & \vdots \\ 0 & 0 & 0 & & r-p \end{pmatrix}$$

$$\left(\qquad \cdots \qquad \right)$$

So we have

$$\det(\mathbf{MM}^T) = [r + (m-1)p] \cdot (r-p)^{m-1}.$$

Theorem 5.2 *Let be* $\mathsf{D}^{\mathsf{S}}\left(2,[m,n,p]\right)$ *with m>n.Let **r** be the constant*

*number of blocks passing through a given point **P** of incidence structure* $\mathsf{S}=(\mathsf{P},\mathsf{B},\mathsf{I})$. *Then* $r> p$ *and any incidence matrix of* $\mathsf{S}=(\mathsf{P},\mathsf{B},\mathsf{I})$ *has rank m.*

*Proof.*Let $B\in\mathsf{B}$ be a block, let $b\in B$ and let $P\notin B$. The set $\{b,\,P\}$

is incident with exactly *p* blocks and all these blocks are distinct from *B*. So, these *p* blocks together with the block *B* constitute in total *p* + 1 distinct blocks which contain *b*. So, we have $r\geq p+1$. Let it be now

k the total number of blocks of incidence structure $\mathsf{S}=(\mathsf{P},\mathsf{B},\mathsf{I})$. Let **M** be the incidence matrix of this incidence structure S. By Theorem *5.1* and (if $r>p$), $\det\left(\mathbf{M}\cdot\mathbf{M}^{T}\right)\neq0$.

Hence, $k\geq\mathrm{rank}\left(\mathbf{M}\right)=\mathrm{rank}\left(\mathbf{M}\cdot\mathbf{M}^{T}\right)=m$.

Theorem 5.6. *Let be* $\mathsf{D}^{\mathsf{S}}\left(2,[m,n,p]\right)$ *with* $m-n\geq2$. *Let **b** the total*

*number of blocks and let **r** the constant number of blocks incidente with a given point of* S. *Define* $\mathsf{S}^{*}=\left(\mathsf{P}^{*},\mathsf{B}^{*},\mathsf{I}^{*}\right)$ *where* $\mathsf{P}^{*}=\mathsf{P}$, $\mathsf{B}^{*}=\mathsf{B}$ *and* $(p,B)\in\mathsf{I}^{*}\Leftrightarrow(p,B)\notin\mathsf{I}$ *for any* $(p,B)\in\mathsf{P}\times\mathsf{B}$. *Then* $p+b-2r\geq1$ *and* $\mathsf{S}^{*}=\left(\mathsf{P}^{*},\mathsf{B}^{*},\mathsf{I}^{*}\right)$ *is a* $\mathsf{D}^{\mathsf{S}^{*}}\left(2,[m,m-n,p+b-2r]\right)$.

*Proof.*Since $m-n\geq2$, any block of B^{*} is incident with at least two

points of P .. We show that every two distinct points P_1 and P_2 of P are incident with exactly $b-2r+p$ blocks of B^{*}. There are exactly *b* blocks in B , exactly *p* of these blocks contain the points {P_1, P_2}, exactly $r-p$ of these blocks containing the point P_1 but not contain the point P_2 and exactly $r-p$ of these blocks containing the point P_2 but not contain the point P_1. Hence, {P_1, P_2} is incident with

$b-(r-p)-(r-p)-p=b-2r+p$ blocks of B*. Since $m-n\geq 2$, we

can choose the points P_1 and P_2 in such a way that these two points are not incidence with a given block B of B . Then the point P_1 and P_2 are incident in S with the blocks B^* of B* and hence $b-2r+p\geq 1$.

Consequently we have that the incidence structure $S^* = \left(P^*, B^*, I^*\right)$ *is*

a $D^{S^*}\left(2, [m, m-n,\, p+b-2r]\right).$

The $D^{S^*}\left(2, [m, m-n,\, p+b-2r]\right)$ defined in Theorem 5.6 is called the

complementary *design* of $D^S\left(2, [m, n,\, p]\right)$.

6. Symmetric designs

The particular sort, symmetric designs, arose, or briefly $D^S_{Sym}\left(2, [m, n,\, p]\right)$ first in the statistical theory of the design of

experiments, but they rapidly have become objects of great combinatorial interest in their own right. Symmetric designs are rather special cases of $D^S\left(q, [m, n,\, p]\right)$ which we have discussed above. (see [1]-[4] and [10]-[12])

Definition 6.1.*A* $D^S\left(2, [m, n,\, p]\right)$*, related with incidence structure* $S = (P, B, I\,)$*, with* $m > n$ *called* **symmetric***, and is marked with*

$D^S_{Sym}\left(2, [m, n,\, p]\right)$ *, and which satisfying the following six statements:*

S.D.1. $|P| = m.$

S.D.2. $|B| = m.$

S.D.3. Any block $B \in B$ is incident with n points.

S.D.4. Any point $P \in P$ is incident with n blocks in B .

S.D.5. Any two *distinct* blocks in B are incident with p points in P .

S.D.6. Any two *distinct* points in P are incident with p blocks in B .

To exclude degenerate cases, we also insist that $n > p.$ From this definition clearly, we have this.

Proposition 6.1. *Let* $D^S_{Sym}\left(2, [m, n,\, p]\right)$ *the dual incidence structure*

$$S^D = \left(P^D, B^D, I^D\right) \qquad D^{S^D}\left(2, [m, n,\, p]\right). \qquad \textit{of the incidence}$$

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structure $\qquad$ S $= (P, B, I\ )$ *is*

Proposition 6.2. *If* $D^S_{Sym}(2, [m, n, p])$, *related with incidence structure*

S $= (P, B, I\ )$, *then* $|P| = |B| = \dfrac{n(n-1)}{p} + 1$.

Proof. Let's have two points $P, Q \in P$, and an block $B \in B$, such that

$P, Q \in B$. If we number in two different ways, triples, pairs –point (P, Q) and block **B**, we find $m(m-1)p = mn(n-1)$, then we have $m = \dfrac{n(n-1)}{p} + 1$.

Proposition 6.3. *Let* $\mathsf{D}^{\mathsf{S}}_{Sym}\left(2,[m,n,\, p]\right)$ *with* $m > n+1$. *Then the*

complementary design $\mathsf{S}^* = \left(\mathrm{P}^*, \mathrm{B}^*, \mathrm{I}^*\right)$ *is a*

$\mathsf{D}^{\mathsf{S}^*}_{Sym}\left(2,[m, m-n, m-2n+p]\right)$.

Proof. By 5.6, $\mathsf{D}^{\mathsf{S}}\left(2,[m,m-n,\, p+b-2r]\right)$, where **b** is the total number of blocks of S and **r** is the constant number of blocks through a given point of S.. By definition 6.1 the total number of blocks of S^* is equal to $b = m$. So, S^* is a symmetric design. Since $n = r$, we have $b - 2r + p = m - 2n + p$.

Theorem 6.4. *Let* $\mathsf{D}^{\mathsf{S}}_{Sym}$ $\left(2,[m, n,\, p]\right)$ *with* $m > n + 1$. *Then the number*

$k = n - p$ *satisfies*
$4k - 1 \leq m \leq k^2 + k + 1$.
If $m = k^2 + k + 1$, *then either the incidence structures* S *or* S^* *is **a** **projective plane*** *of order* $k \geq 2$.
Proof. By proposition 6.2, we have
$$m = \frac{n(n-1)}{p} + 1 \; = \; p + 2k + \frac{k(k-1)}{p} \Rightarrow m = \; p + 2k + \frac{k(k-1)}{p} \Rightarrow$$

$mp = p^2 + 2kp + k(k-1) \Rightarrow p^2 + \left(2k - m\right)p + k(k-1) = 0$

Hence,
$\Delta = (m - 2k)^2 - 4k(k-1) \geq 0$
and $p \in \{p_1,\, p_2\}$ where

$$\sqrt{}$$

$$p_1 = \frac{1}{2} \left(m - 2k + \sqrt{(m-2k)^2 - 4k(k-1)} \right) \text{ and}$$

$$p_2 = \frac{1}{2} \left(m - 2k - \sqrt{(m-2k)^2 - 4k(k-1)} \right).$$

Let $S^* = \left(P^*, B^*, I^*\right)$ be the complementary desingof $S = \left(P, B, I\right)$.

Then S^* is $\mathsf{D}^S_{Sym}\left(2, \left[m^*, n^*, p^*\right]\right)$, where $m^* = m$, $n^* = m - n$ and

$p^* = m - 2n + p$. But by the condition of the theorem, we have
$k^* = n^* - p^* = \left(m - n\right) - \left(m - 2n + p\right) = n - p = k$.
So, we have
$\left(m^*, k^*\right) = \left(m, k\right)$ and $\left(p, p^*\right) = \left(p_1, p_2\right)$.
Since $p, p^* \geq 1$, we have $p_2 \geq 1$ or equivalently that

$m - 2k - 2 \geq \sqrt{(m - 2k)^2 - 4k(k - 1)}$.
After squaring, we find $m \leq k^2 + k + 1$. If $m = k^2 + k + 1$, then we have

$p_2 = 1$. We have $n = k + 1$ if $p = p_2 = 1$ and $n^* = k + 1$ if $p^* = p_2 = 1$.

So, the incidence structure S or S^* is a projective plane of order k.
Consequence 6.5. *If* $m = 4k - 1$, *then* $k \geq 2$ *and incidence structure*

S *is either* $\mathsf{D}^S\left(2, \left[4k - 1, 2k - 1, k - 1\right]\right)$ *or* $\mathsf{D}^S\left(2, \left[4k - 1, 2k, k\right]\right)$.
Proof. Note that $n \geq 2$ since $m > n + 1$. The condition

$(m - 2k)^2 - 4k(k - 1) \geq 0$ given above implies that

$(m - 2k)^2 \geq (2k - 1)^2 - 1$. Now, $m - 2k = p + p^* \geq 2$. Hence,

$(m - 2k)^2 \geq (2k - 1)^2$ and $m \geq 4k - 1$. If equality holds, then
$p \in \{p_1, p_2\} = \{k, k - 1\}$.
If $p = k$, then $n = 2k$ and if $p = k - 1$, then $n = 2k - 1$. The conditions that
$m > n + 1$ and $n \geq 2$ imply that $k \geq 2$.

7. Hadamard matrices and designs

*AHadamard matrix of order **m** is an m×m*

*matrix **H***

with entries: ±1whitch satisfying $\mathbf{H} \cdot \mathbf{H}^{\mathrm{T}} = \mathbf{H}^{\mathrm{T}} \cdot \mathbf{H} = m\mathbf{I}$.

These matrices are closely related to symmetric designs in a number of ways. Changing the sign of all entries in any row or column does not disturb the defining equation. We may therefore assume, if we like, that all entries in the first row and column are +1; call such a Hadamard matrix normalized (see [1], [2], [3], [4] and [10], [11], [12]).

Proposition 7.1. *The order of a Hadamard matrix **H**is either* 1, 2 *or a multiple of* 4.

If we now delete the first row and column and replace -1 by 0 throughout we obtain a matrix M which (for $m \geq 4$) is the incidence matrix of a $D_{Sym}\left(2, \left[m-1, \dfrac{m}{2}-1, \dfrac{m}{4}-1\right]\right)$. Such a symmetric design is called a Hadamard design.

From any $D_{Sym}\left(2, \left[m-1, \dfrac{m}{2}-1, \dfrac{m}{4}-1\right]\right)$ we may in turn recover a *normalized Hadamard matrix*.

$$
\begin{pmatrix}
+1 & +1 & +1 & +1 & +1 & +1 & +1 & +1 \\
+1 & -1 & +1 & -1 & +1 & -1 & +1 & -1 \\
+1 & +1 & -1 & -1 & +1 & +1 & -1 & -1 \\
+1 & -1 & -1 & +1 & +1 & -1 & -1 & +1 \\
+1 & +1 & +1 & +1 & -1 & -1 & -1 & -1 \\
+1 & -1 & +1 & -1 & -1 & +1 & -1 & +1 \\
+1 & +1 & -1 & -1 & -1 & -1 & +1 & +1 \\
+1 & -1 & -1 & +1 & -1 & +1 & +1 & -1
\end{pmatrix}
\longleftrightarrow
\begin{pmatrix}
0 & 1 & 0 & 1 & 0 & 1 & 0 \\
1 & 0 & 0 & 1 & 1 & 0 & 0 \\
0 & 0 & 1 & 1 & 0 & 0 & 1 \\
1 & 1 & 0 & 0 & 0 & 0 & 0 \\
1 & 1 & 0 & 0 & 1 & 0 & 1 \\
0 & 0 & 0 & 0 & 0 & 1 & 1 \\
1 & 0 & 1 & 0 & 1 & 1 & 0
\end{pmatrix}
$$

A Normalized Hadamard Matrix   Associated Hadamard Design

Definition   7.2   A $D\left(2, [4k-1, 2k-1, k-1]\right)$, *for $k \geq 2$ called a***Hadamard design** *of order k.*

A   Hadamard   design   of   order   **k**contains
$b = \dfrac{(4k-1)(4k-2)(k-1)}{(2k-1)(2k-2)} = 4k-1 = m$ blocks   and   is   therefore

symmetric. The complementary design of a Hadamard design of order k is a $D\left(2, [4k-1, 2k, k]\right)$.

From the connection between Hadamard matrices and symmetric designs above, it follows almost immediately that a necessary condition for the existence of a Hadamard matrix of order m is that

$m = 1$, $m = 2$ or $m = 0 \pmod{4}$. At present, no proof is known, but Hadamard matrices of order m have been found for all m divisible by 4 up through 264.

It is easy to test the result below, that Hadamard matrices of order at least eight and Hadamard designs are equivalent mathematical object.

Theorem 7.2 *Suppose* **H** *is a normalized Hadamard matrix of order* $4m > 4$. *If* **M** *is the* $(4m-1) \times (4m-1) -$ *matrix obtained by deleting the first row and column of* **H**, *and* **M'** *is the matrix obtained from* **M** *by replacing each entry* -1 *by* 0, *then* **M'** *is the incidence matrix of a Hadamard* $D_H\left(2,\left[4m-1, 2m-1, m-1\right]\right)$. *Conversely, the incidence matrix of any Hadamard* $D_H\left(2,\left[4m-1, 2m-1, m-1\right]\right)$ *arises in theabove fashion.*

Example The Fano plane is also the smallest example of a Hadamard 2-design, that is, a $D_H\left(2,\left[4p+3, 2p+1, p\right]\right)$ design. So, for p=1, we have $D_H\left(2,\left[7,3,1\right]\right)$ which is the projective plane of order 2, so it's the Fano plane.
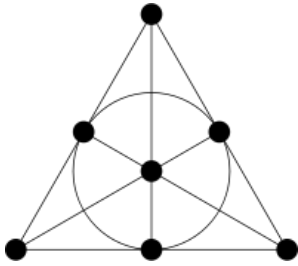
Conclusions and recommendations

In this article, we have present some fine relationships between the finite affine plane (Theorem 4.3) and the finite projective plane (Theorem 3.2) with Steiner systems and design theory. We also presented a description for symmetric designs and links to it with finite projective plane (Theorem 6.4.). In the last part we have presented a description about Hadamard designs, where we have also introduced an example of how the Fano plane is the smallest example of a Hadamard 2 design. I think there is an interest in studying the relationships between the finite affine plane and the finite projective plane and design theory and to look for real applications of these relationships (in the coding theory there are very good opportunities). A concrete example of such a relationships, very useful, is also given in [8]. Design-theory connections can be viewed with subplanes, biplanes, thirst.

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DISCRETE DYNAMICAL SYSTEMS, EXPONENTIAL GROWTH

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Abstract

This paper studies discrete dynamical systems,where the state of the system evolves in discrete time steps.Difference equations are now used in modelling motion and change in all areas of science. There are given some fundamental concepts of discrete dynamical systems. Furthermore, it is given the exponential growth, the way it is formed. Discrete dynamical systems are widely used in population modelling. There have conducted tests with practical data. There are given comparisons of predicted data and actual data of the population growth of Albania using charts, tables and figures. The discrete dynamical systems are used to calculate the population in one year's time, in two years' time, etc.

Keywords: Discrete Dynamical Systems, Exponential Growth, Difference Equations, Population.

1. Introduction

Modern dynamical system theory (both continuous and discrete) is not that old. It began in the last part of the nineteenth century, mainly due to the work of Poincaré who (among lots of other topics) introduced the Poincaré return map as a powerful tool in his qualitative approach towards the study of differential equations. Later in the twentieth century Birkhoff (1927) too made important contributions to the field by showing how discrete maps could be used in order to understand the

global behaviour of differential equation systems.[1] In this paper we shall concentrate on discrete dynamical systems. A dynamical system is any mathematical model which describes the state of a system in time. For example, mathematical models which describe the oscillation of the mathematical pendulum, the flow of the water in the tube, the number of population in a metropolis, etc are dynamical systems.[2] Here, we introduce dynamical systems where the state of the system evolves in discrete time steps, i.e., discrete dynamical systems. When we model a system as a discrete dynamical system, we imagine that we take a snapshot of the system at a sequence of times. The snapshots could occur once a year, once every millisecond, or even irregularly, such as once every time a new government is elected. When we take these snapshots, the idea is that we are recording whatever variable determine the state of the system: our chosen state variables that evolve through the state space. To complete the description of the dynamical system, we need to specify a rule that determines, given an initial snapshot, what the resulting sequence of future snapshots must be. Here, we introduce these basic concepts of a dynamical system through an example involving the evolution of a population.[6] Mathematical applications and models are widely used in everyday life. Being able to forecast population in the future, and even being able to answer some interesting questions about population in the past, depends on developing accurate mathematical models of population growth.[5] The aim of this paper is modeling in the population field. There will be discussed basic concepts and mathematical models of the dynamics of the population, including exponential growth.A population is "a group of plants, animals, or other organisms, all of the same species, that live together and reproduce". This paper will make it possible to see how the theoretical part of mathematics has several realworld applications. Using only two data points, an exponential growth population model isdeveloped and used both to project future population and compare to past population data.[4] Discrete time models are constructed to describe phenomenon in terms of fixed time steps. In general, we consider a sequence of quantities, $x_0, x_1, x_2,...,$ where x_i denotes the

quantity after$i$time steps. If x_{n+1} depends only on x_n, a discrete time model is expressed by

$$x_{n+1} = f(x_n), \quad \begin{matrix} n = 0,1,2,... \\ (1) \end{matrix}$$

with some initial condition x_0. This discrete model is called a difference equation. [3]

The discrete model gives

$$x_1 = f(x_0)$$

$$x_2 = f(x_1) = f\left(f(x_0)\right) = f^{[2]}(x_0)$$
$$x_3 = f(x_2) = f\left(f(x_1)\right) = f\left(f\left(f(x_0)\right)\right) = f^{[3]}(x_0)$$

....

The resulting sequence $x_0, x_1, x_2,...,$ is called an orbit of the map f. x_n

in the discrete model can represent the population size of lemmings in month n, or the number of bacterial cells in a culture on day n.

2. The Model of Population and Results

Recall from calculus that a population grows exponentially if its rate of change is proportional to its current population. In the language of discrete systems, we can write this as the following: Let P_t be the

population in year t. Then, using the simple exponential growth model, we could write

$$P_{t+1} - P_t = rP_t \Rightarrow P_{t+1} = (r+1)P_t$$

If given the initial population P_0

$$P_1 = (r+1)P_0$$
$$P_2 = (r+1)P_1 = (r+1)^2 P_0$$
$$P_3 = (r+1)P_2 = (r+1)^3 P_0$$

$$P_t = (r+1)^t P_0$$

$$(2)$$

whichis the solution of this discrete model.[3]

If $r+1 > 1$, $\lim_{t \to +\infty} \left((r+1)^t P_0\right) = +\infty \Rightarrow$ the population grows unboundedly.

If $0 < r+1 < 1$, $\lim_{t \to +\infty} \left((r+1)^t P_0\right) = 0 \Rightarrow$ the population will disappear.

If $r = 0$, then $P_t = P_0$, for all $t \Rightarrow$ the population will remain constantlyequal with the size P_0.

Now using the equation (2) we can find r and calculate the population for different years. We will apply the equation (2) for the Albanian population.
Using the data with $t = 0$ corresponding to the year 1990, we have

$P_0 = 3,188,380$. Wecan solve r using the fact that $P = 3,080,124$ when

$t = 10$ which is the year 2000. [4], [5]By using (2)
$$3,080,124 = (r+1)^{10}3,188,380 \Rightarrow r = -0.00345$$
The general solution is given to us
$$P_t = (1 - 0.00345)^t \cdot 3,188,380$$
We are now going to compute the population at later years and compare it to the actual data. The following chart represents it. [4], [5], [7].
TABLE I:

Year	Actual	Predicted
2001	3063320	3,069,446
2002	3057018	3,058,857
2003	3,044,993	3,048,304
2004	3,034,231	3,037,787
2005	3,019,634	3,027,307
2006	3,003,329	3,016,862
2007	2,981,755	3,006,454
2008	2,958,266	2,996,082
2009	2,936,355	2,985,745
2010	2,918,674	2,975,445
2011	2,907,368	2,965,179
2012	2,903,008	2,954,949
2013	2,897,770	2,944,755
2014	2,892,394	2,934,595
2015	2,885,796	2,924,471
2016	2,875,592	2,914,382
2017	2,876,591	2,904,327

| 2018 | 2,870,324 | 2,894,307 |
| 2019 | 2,862,427 | 2,884,322 |

Population in time - Albania

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Year	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Actual	3E+0	3E+0	3,04	3,03	3,01	3,00	2,98	2,95	2,93	2,91	2,90	2,90	2,89	2,89	2,88	2,87	2,87	2,87	2,86
Predicted	3,06	3,05	3,04	3,03	3,02	3,01	3,00	2,99	2,98	2,97	2,96	2,95	2,94	2,93	2,92	2,91	2,90	2,89	2,88
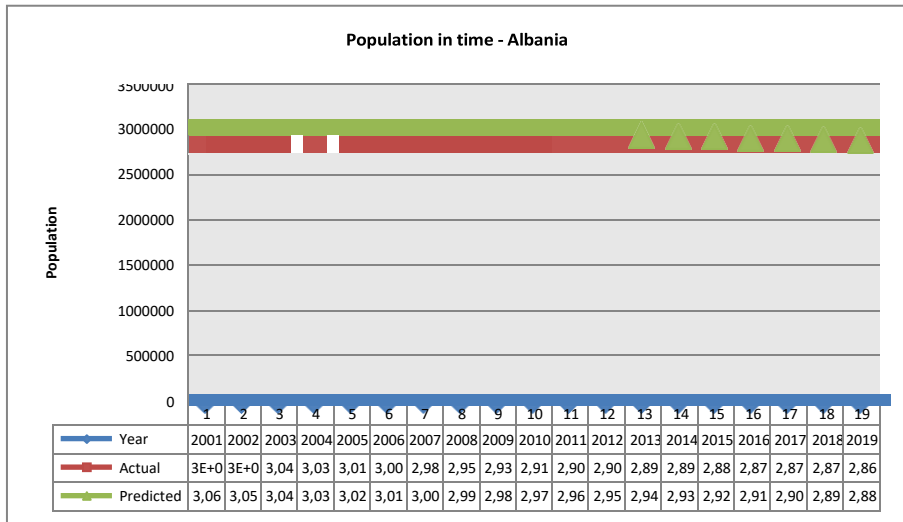
Conclusions

In this paper we focused in applications to demography, particularly to population growth models. Future work must include applications to economics of dynamical systems. Exponential growth model gives us an opportunity in predicting the population size. It is obviously clear that the predicted data is almost the same as the real one. The prediction about the Albanian population is an example of how fairly well this model works. There is an excellent fit between the predicted and actual data for the population of Albania in the years 2001-2019. This provides us an amazing tool to forecast the population growth in the future.[4], [5]

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THE INFLUENCE OF DAMPING PARAMETERS ON OSCILLATIONS ARISING IN OVERHEAD POWERTRANSMISSION LINES

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Abstract

Some flexible structures (overhead transmission lines, suspension bridges - to name a few) can be subject of oscillations due to different causes. The oscillations that occur in overhead power transmission lines can cause structural damage to the cables and material fatigue. To control the behavior of oscillations, and so to suppress their negative effects, various types of dampers are applied in practice. The physical model may be that of a string each end of which is attached to a dashpot system - here refereed as two damping model, or only one end of the string is attached to dashpot - referred as one damping model. The mathematical models of oscillations are initial-boundary value problems for weekly nonlinear hyperbolic differential equations with non-classical boundary conditions depended on dashpots applied. The main objective is to explore in details the influence of damping parameters on the behavior of oscillations. An efficient numerical method described in literature, is adopted in order to compute the amplitude of the wave for the one and two damping problems as a function of its damping parameters. Further we investigate what we call modal solutions for the one and two damping problems, as a simple way to study the tendency of the solution u as time t tends to infinity. *The method is implemented in Matlab and* the most typical results are presented graphically. The results are compared with those appearing in literature for one damping problem. Meantime new results reported

for the two damping problem are compared with those of one damping case. Detailed and helpful conclusions are drawn in each case.

Keywords: *W*ave equation, boundary damping, modal solution, Matlab implementation.

1. Introduction

The mathematical models that describe the oscillations of some flexible structures can be expressed as initial-boundary value problems for wave equations like in [1, 3, 4] or for string equations like in [2]. The following model is derived and analyzed in [3] for the vibrations of a string which is fixed at x = 0 and is **attached to a dashpot system at x = π:**

Find the function u(x, t) which satisfies the equation

$$u''_{tt} - u''_{xx} = \varepsilon(u'_t - \frac{1}{3}u'^3_t), \quad 0 < x < \pi, \ t > 0, \tag{1}$$

subject to boundary conditions

$$u(0, t) = 0, \quad t \geq 0, \tag{2}$$
$$u'_t(\pi, t) = -\varepsilon\alpha u'_x(\pi, t), \quad t \geq 0, \tag{3}$$

and initial conditions

$$u(x, 0) = \phi(x), \quad 0 \leq x \leq \pi, \tag{4}$$
$$u'_t(x, 0) = \psi(x), \quad 0 < x < \pi. \tag{5}$$

The functions $\phi(x) \ and \ \psi(x)$aboveare the initial displacement and the initial velocity of the string, the damping parameter α is a positive constant, and ε is a small dimensionless parameter$(0 < \varepsilon \ll 1)$. An efficient numerical method is developed in [4] for the solution of (1) - (2) - (3) - (4) - (5) problem.

Hereafter we will refer the model (1) - (2) - (3) - (4) - (5) as one damping problem. We also will consider in this paper the model of a string each end of which is attached to a dashpot systems. So the boundary conditions (2) - (3) above can be written as

$$u'_t(0, t) = \varepsilon\alpha_1 u'_x(0, t), \quad t \geq 0, \tag{6}$$
$$u'_t(\pi, t) = -\varepsilon\alpha_2 u'_x(\pi, t), \quad t \geq 0, \tag{7}$$

where damping parameters α_1 and α_2 are positive constants. The numerical method developed in [4] is extended for this last model in [5]. As in [5], we will refer this model hereafter as two damping problem. Both two models above can be used to describe the galloping oscillations of the overhead transmission lines in a wind field.

In the second part wecompute and investigate the amplitude of

the wave for the one and two damping problems as a function of its

damping parameter α, $α_1$, and $α_2$. Further we investigate the so-called modal solutions, and related matters, for the one and two damping problems. Numerical results are presented graphically and useful conclusions are drawn.

2. The influence of damping parameters on oscillations

The numerical methods of [4] and [5] are adopted in this section in order to compute the amplitude M of the solution for the one and two damping problems. The adopted method is implemented in Matlab and the solution u, as well as its partial derivatives u_t' and u_x' are computed in a sufficiently fined squared grid, similar as it appears in Figure 1.

In this Figure we can see the characteristics curves of equation (1), the triangle region, where the solution is influenced only by initial conditions (4)-(5), and the other remained part, where the solution is influenced also by the boundary conditions (2)-(3) or (6)-(7).

We denote by by U, U_t and U_x the three corresponding solution matrices. If the stepsize of the squared grid is h, then the dimensions of the above matrices would be MxN, where $h = π / (M-1)$ and also $h = T / (N-1)$. The amplitude of the solution could be computed as the maximal value of the matrix received by the absolute values of U.

In a series of numerical experiments the one and two damping problems (1-7) are solved for different values of damping parameter α, $α_1$, and $α_2$, and for various initial conditions and in each case the amplitude of the solution is computed. For simplicity we will take here $α_1 = α_2 = α$. Amplitude vs. damping parameter α is investigated. The most typical graphs are presented in the figures 2 and 3..
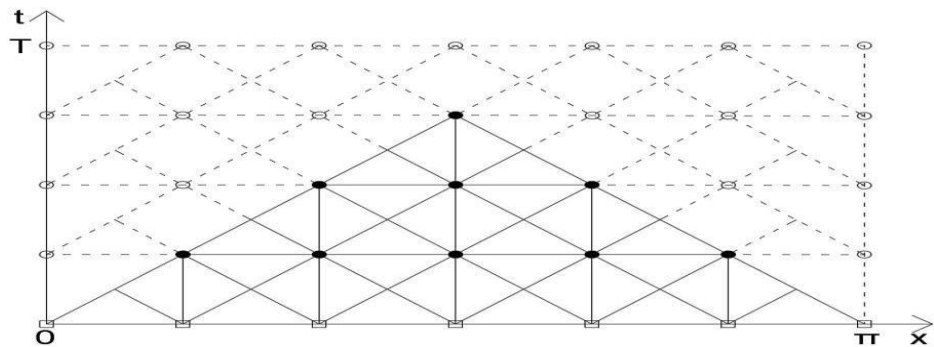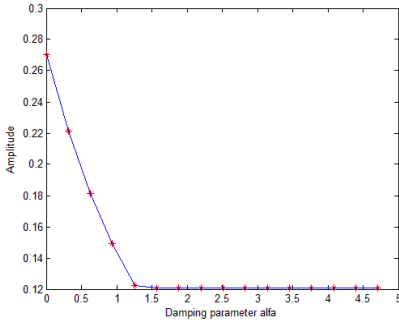

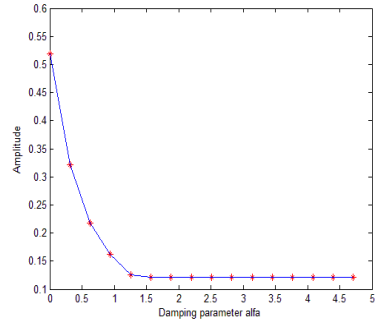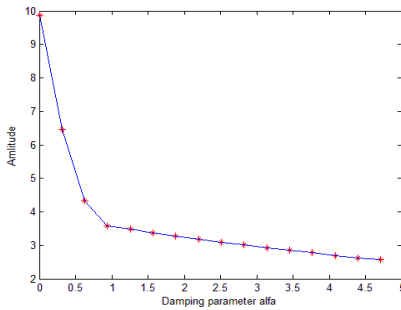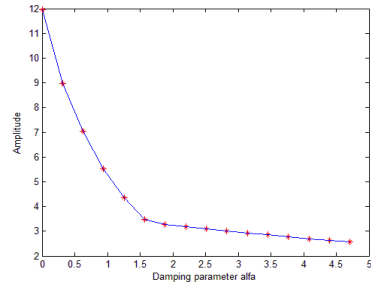Figure 1: Example of grid where the solution is computed.

(a)   φ(x)=0.1sin(0.5x), ψ(x)=0.05sin(0.5x)

(b)   φ(x)=2.5sin(3.5x), ψ(x)=0.05sin(3.5x)

(b)   φ(x)=2.5sin(3.5x), ψ(x)=0.05sin(3.5x)

Fig.2. Amplitude vs. damping parameter α
One damping model

Fig.3. Amplitude vs. damping parameter α
Two damping model

From the figures 2 and 3above it can be seen that amplitude of the wave is a strong decreasing function for values of damping parameters less than around π/3 and it begins to stabilize after that value. This function runs more smoothly in case of two damping problems. The stabilization values of damping parameters are slightly depended on the initial conditions of problems solved.

In the figures 4 below wehave superimposed two graphs. The first one, red dashes line, is Amplitude vs. Damping parameter α for

the one damping model. The second graph, blue solid line, is Amplitude vs. Damping parameters $\alpha_1 = \alpha_2 = \alpha$ for the two damping model. Monochromatic conditions of the form

$\varphi(x) = a_n\sin(nx)$ and $\psi(x) = b_n\sin(nx)$

are selected for this demonstration. For the two damping problem it makes sense to apply symmetric initialdisplacement. So we have selected below for this model the initial conditions $\varphi(x) = 0.2\sin(x)$ and $\psi(x) = 0.2\ \epsilon\alpha\ (1-\frac{2}{\pi}x)\cos x$ (the function $\varphi(x)$ is symmetric around the midpoint $x = \pi/2$, in the interval $[0\ \pi]$.

The figures 4 clearly demonstrate the advantage of two damping model in suppressing of the oscillations.
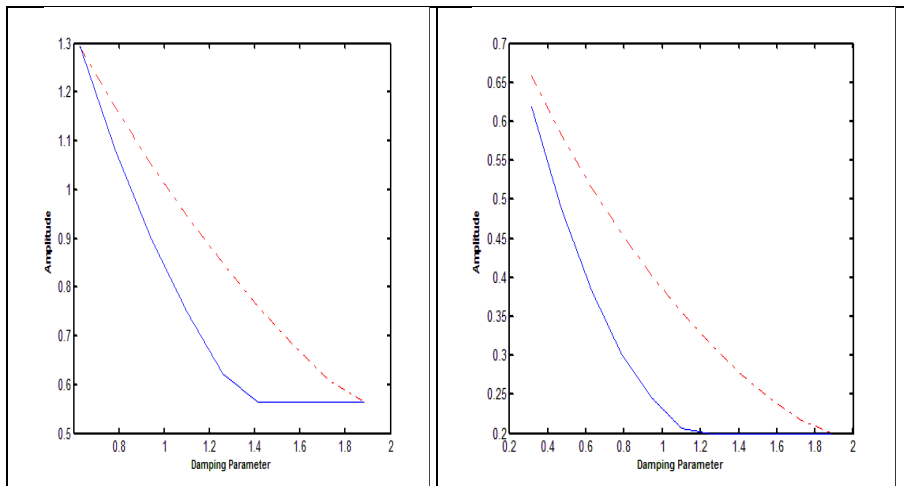
a) $\varphi(x) = 0.01x^3e^{-3x/\pi}$, $\psi(x) = 0.2x(\pi-x)$ b) $\varphi(x) = 0.2\sin x$, $\psi(x) = 0.2\ \epsilon\alpha (1-\frac{2}{\pi}x)\cos x$

Fig.4. Amplitude vs. damping parameters α
i) One damping model - red dashes line ii) Two damping model - blue solid line

It is evident that the amplitude is an important characteristic of the wave. In order to have under control the oscillations one has at least to keep under control the amplitude of the wave.However, more than amplitude of the wave, the tendency of the solution u as time t tends to infinity is more important to be investigated versus damping parameters.In practice we are first interested in finding of those values

of the damping parameters α and $\alpha_1\alpha_2$ above for which the solution $u(x,t)$ tends to zero or tends to a certain bounded function.

To simplify the situation we have investigated the dynamics of modal solutions. The term modal solution here is referred to trajectories of the forms u(t) = u(x_M, t), where (x_M , t_M) denotes the point where the amplitude of the wave is reached. In other words we investigate the dynamic of the amplitude in time for different values of damping parameters.

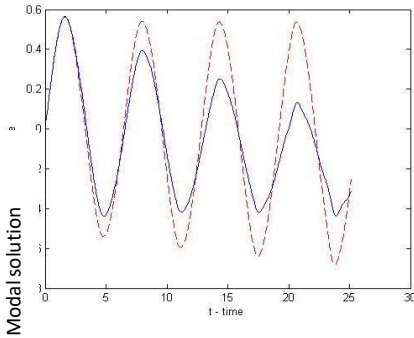In the Figure 5 below are presented the graphs of modal solutions for the one and two damping models.

(a)   α=π/4

(a)   α=π/4

(b)   α=π/2

(b)   α=π/2
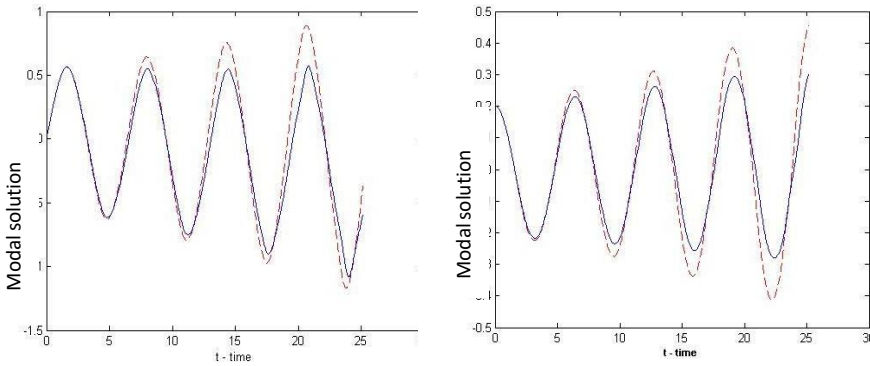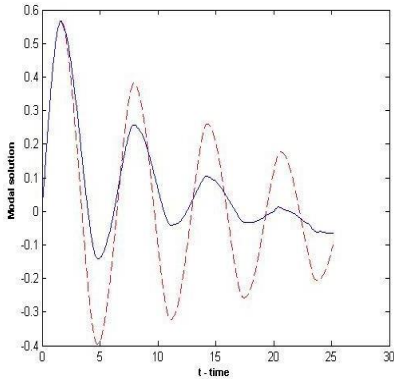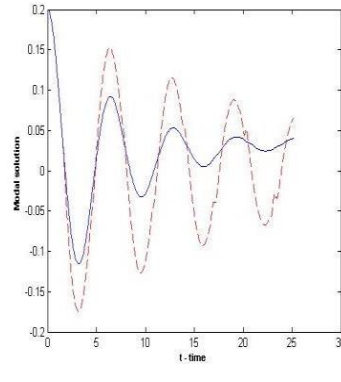
(c) α= π   t - time   (c) α= π   t - time

Fig. 5. Modal solution vs. time t for
$\varphi(x) = 0.01x^3e^{-3x/\pi}$, $\psi(x) = 0.2x(\pi-x)$, $\epsilon = 0.1$.
a) One damping model - red dashes line
b) Two damping model - blue solid line

Fig. 6. Modal solution vs. time t for
$\varphi(x) = 0.2\sin x$, $\psi(x) = 0.2\epsilon\alpha$ (1- $\frac{2}{\pi}$ x)cosx,ϵ=0.1.
a) One damping model - red dashes line
b) Two damping model - blue solid line

        The graphs are presented for 3 different typical values of damping parameters α = π/4, α = π/2, and α = π, and for the arbitrary initial conditions $\varphi(x) = 0.01x^3e^{-3x/\pi}$,$\psi(x) = 0.2x(\pi-x)$. The three corresponding pairs of graphs are superimposed in order to compare the one and two damping models. Meantime, the selection of specified values of damping parameters above, as well as the specified initial conditions, are motivated by the need to compare results and final conclusions with those appearing in literature [3] and [4]. In the Figure 6 we have done the same as in Figure 5, but this time for the monochromatic conditions $\varphi(x) = 0.2\sin(x)$ and$\psi(x) = 0.2\epsilon\alpha$ (1- $\frac{2}{\pi}$ x)cosx.
        The analyses for the tendency of the solution could be simplified if we investigate the tendency of the extreme points in each graphs of figures 5 and 6. Exponential decay for decreasing case, and

logistic low for bounded increasing case, are two typical types of tendency in common, for wave processes.

As we are interested for decreasing case, the basic parameters, frequency ω and rate of decay k, in the typical decreasing format $Ae^{-kt}\sin(\omega t + \phi_0)$, can be numerically computed based on extreme points. These last can be identified numerically using proper entries of U. A Matlab code is built for that purpose which uses Matlab utilities such as: diff, sign, find, etc. Rate of decay k can be studied as function of α. So, the critical value of α, which divides decreasing solutions from those increasing, can be found.

Conclusions

1) In all experiments done we have seen the effectiveness of damping parameters to **suppress and stabilize the oscillation.**As damping parameter α increases the two damping model becomes more effective and reliable compared to one damping model.

2) For value of α larger then $\pi/2$ the modal solutions, therefore the solutions, of one damping problem, tend to zero as time t tends to infinity. This is in accordance with the conclusions in [3] and [4]. In case of the two damping model, the solutions will tend, of course to a normal stabilized value different from zero, for α larger than α -critic, which is considerably lower than $\pi/2$.

3) The rate of convergence to zero or to normal stabilized value can also be numerically found using the extreme points of modal solutions. A conventional value forα -critic can also be found after sufficient trials with different initial conditions.

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APPARENT STRESS DETERMINATION FROMRADIATED SEISMIC ENERGY AND SEISMIC MOMENT OF SMALL AND MODERATE EARTHQUAKES IN ALBANIA

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Abstract
Apparent stress for different seism tectonic conditions within Albanian territory is determined based on records of small to moderate earthquakes recorded by ASN. Method is based on Wyss and Brune (1968) definition, using broad-band radiated seismic energy and seismic moment as the main macroscopic physical parameters of a seismic source. This work is focused namely on the accurate correction of the seismic source spectra locally, accounting for the attenuation and radiation effects. A set of 90 earthquakes has been selected, for which the waveforms recorded on both horizontal components have been processed. Source parameters are determined from displacement source spectra using Brune ω^{-2} model. Radiated seismic energy is computed based on PSD velocity spectra in the frequency domain. A grouping according to the local tectonic pattern assuming different stress regimes, is performed. A set of zones named as al001, al002, al003, al004 and al005, respectively for longitudinal Adriatic and Ionian seism genic zones, transversal Elbasani-Dibra seism genic zone and Mirdita zone as part of the inner domain, have been modelled. Apparent stress varies in an average within the interval 0.01-10 MPa. We observe a variation in apparent stress values for Albanian territory generally in accordance with global ones (0.03-6.69 MPa). Apparent stress scales with the seismic moment assuming a constant shear

modulus ($\mu = 0.3$ x 10^5 MPa). A mechanism dependent scaling $\sim M_0^{[(-0.1) - (-0.26)]}$ for oblique faults and $\sim M_0^{[0.69 - 1.75]}$ for pure thrust and normal faults has been achieved as well, showing the importance of the apparent stress in the seism tectonic characterization of a seismically active region.

Keywords: Apparent stress, radiated seismic energy, seismic moment, scaled energy.

1. Introduction

The geological and tectonic pattern of Albania is well established, up to now, by numerous research studies [9]. Based on generalized results, the Albanian territory, is subdivided into two main domains, from the geological and seismotectonic point of view.Thus, Albania comprises the outer domain laying along the coastal area, morphologically characterized by lowland terrains, and the inner domain, characterized by mountainous morphology. The frontal collision against Adria microplate as well as the inland expressed active young tectonics of Albanides, has caused the Albanian territory to be dissected and complicated by numerous active faults of various type and age. By consequence, the seismic activity is concentrated mostly along these known active faults. Primary, by mean of the focal mechanism solution [9], it is revealed the predominance of a compressional stress regime in the outer domain and that of an extensional stress regime in the inner one.

This regional division coincides with the Adria and the Eurasian lithospheric plates, correspondingly. On both domains, the territory is cut through by numerous longitudinal and transversal active faults, grouped in fault zones. These are the main sources of seismic activity, making thus Albania the most seismically active area of the Alpine-Mediterranean seismic belt. Despite the fact that the seismic instrumental monitoring in Albania started in 70-es, the way of instrumentation conditioned also the level and accuracy of analysis. Up to 2000, along with being representative, the research studies were based mainly on the focal mechanism and statistical analyses, as the only tools used to determine the natural stress field in Albania. Advanced quantitative analyzes such as apparent stress determination [14]were hardly performed until 2008.The first real attempt using the spectral analysis to determine the seismic stress, was based on strong

motion recordings, on a limited number of moderate earthquakes, in terms of the stress drop parameter, according to Brune model,[(Duni, Ll. and Kuka, N., 2008)]. Later improvements have widely supported the application of spectral techniques. As regard, the apparent stress along with the other source parameters, making use of available broadband (BB) waveform records, have been determined [6].

In the physics of the seismic source, the apparent stress represents an important quantity, to characterize a seismically active region. It is directly related to the scaled seismic energy, thus expressing the seismic efficiency in a specific region. It relates the static and dynamic characteristics of a given source [13]. Correspondingly, apparent stress varies locally depending on the type of seismic sources as well as on the strength properties of the tectonic environment, [15]. From the physical point of view its values assign the lower bound for the natural stresses acting within a seismotectonic environment serving as an important discriminator between regions with different seismotectonic characteristics.

Its determination is primary related to the capability for a correct determination of the radiated seismic energy from broadband seismic wave field. After the installation of the Albanian Broadband Seismological Network (ABBSN), it became possible to perform such analysis[5], [6]. A first attempt to the application of the Wyss-Brune method, taking into account the period 2008-2009, has been successfully accomplished [16]. In this work, we have considered a broader time period, thus increasing the quantity and the quality of recorded waveforms from the broadband stations, in order to statistically sustain the achievements. Once again, the application of the selected method and the analysis of the achieved results will be the main subjects of this work.

2. Data

Data comprises waveforms, from broadband recordings of moderate earthquakes, during the period 2008-2015.The location of earthquakes is mainly within the Albanian territory, as plotted on the map (Fig.1).A number of 90 earthquakes have been chosen as representative database to compute the source parameters and the radiated seismic energy. Waveforms have been sampled at 100 sps, containing information with the frequency range 0.033 Hz -100 Hz.

Equipment are installed in each of the seismological stations, operating in specific sites in Albania, (Fig.1). To ensure the accuracy of the spectral analysis, a relocation is performed as well, by hypocenter routine [7], accounting for a local 1D horizontal layered velocity model determined through Wadatti method, [6]. The velocity model takes in consideration a vertical velocity gradient of V_P for primary body waves, changing linearly with depth every 5 km.For further spectral analyze only horizontal components, N-S and E-W, have been taken in consideration after correcting for the total system response, [5], [6].
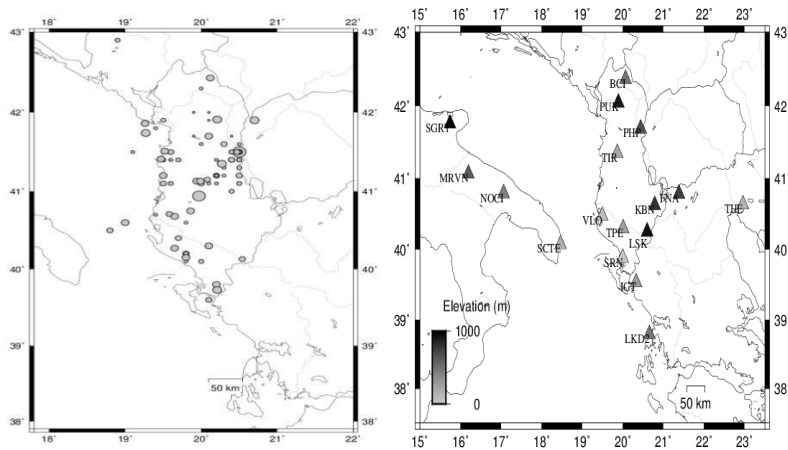

Fig.1–Distribution of earthquakes used in the analysis, recorded during the period 2008-2015, and BB seismological stations of the Albanian Seismic Network (ASN) and neighbor ones.

3. Method

The method is based on the parametrical relation for the apparent stress as represented by Wyss and Brune [14]:

$$\tau_{app} = \mu \frac{ES}{M_0}$$

(1)

In the above expression, μ represents the shear modulus in the source medium volume, E_S is the radiated seismic energy expressed in ergs, and M_0 the seismic moment in dyne-cm. Both these parameters are determined from broadband, corrected spectral source function, assuming the path, site and system response effects. In order to account

for the path effect, a local attenuation model for Albanian crust has been determined, applying the single back-scattering method on S-coda waves[2]; [1]. Assessed model consists in two different effects: anelastic factor expressed by the mean quality factor Q and near surface attenuation factor influencing the highest frequency content of the source spectrum, expressed by diminution parameter κ, (Tab.1). Both these factors influence the level of the spectral amplitudes as well as the decay of the source spectrum at frequencies $f > f_c$, leading as consequence to incorrect determination of the corner frequency if not taken into account properly. Determination of the local frequency attenuation model for Albania (Tab. 1), [6], using the single back-scattering method, is performed through Coda-Q routine in Seisan ver. 10.4, [7].We have substituted κ = 0.055 and a local Q-model in the form $Q(f) = 83\, f^{\,0.84}$ to account for the mean anelastic attenuation and the high frequency diminution factor, on the spectral amplitudes of body waves, as fitted for the Albanian territory [7]. Anelastic attenuation is assumed to be frequency independent with a constant value of $Q_0 = 83$, for frequencies less than 1.0 Hz, and varies with frequency following the relation:

$$Q\,(f) = Q_0 * (1 + \frac{f}{X})^{\alpha} \qquad (2)$$

We have assumed an X = 1.0, in order to apply the parametric relation Q(f) regarding its application in Seisan 10.4. A correction for the geometrical spreading correction of body waves, has been considered as well, in the form [8]:

$$G(r, h) = \frac{1}{GD} = \frac{1}{\sqrt{r^2 + h^2}} \qquad (3)$$

In (3), r (km) represents the epicentral distance; h (km) is the hypocenter depth; GD stands for the geo-distance term, taken as 100 km to differ between local and regional distances, in order to assume the proper geometrical spreading correction.

Both up-mentioned corrections approximate the flat part level of the spectral amplitudes at low frequencies ($f < f_c$), and the spectral decay part of the observed spectrum, proportional to ω^{-2} for frequencies greater than this characteristic frequency determined by the intersection of these two spectral intervals, (Fig. 2).

Table 1. Local attenuation model for Albania.

Station Code	Q₀ (at 1 Hz)	Atten. Term. α	dimin. par. κ
BCI	87	0.84	0.06

PHP	81	0.84	0.05
PUK	75	0.84	0.06
TIR	83	0.84	0.05
KBN	96	0.84	0.05
SRN	74	0.84	0.05
VLO	81	0.84	0.06

Displacement spectra are obtained, applying Brune model [3], where FFT is applied for each of the horizontal recorded components to convert from time to frequency domain. In the displacement spectrum form (2), both factors 0.6 ($R_{\theta, \varphi} = 0.63$ as a mean correction for secondary body waves) and 2.0 are applied respectively to correct for mean radiation pattern and effect of free surface based in the point source approximation.

$$D(f) = \frac{M_0 \cdot 0.6 \cdot 2.0}{(1+(\frac{f}{f_0})^2)4\pi\rho v^3 R}(e^{-\pi f(0.05)} \cdot e^{\frac{-\pi f t}{(84 \cdot f^{0.84})}}) \qquad (4)$$
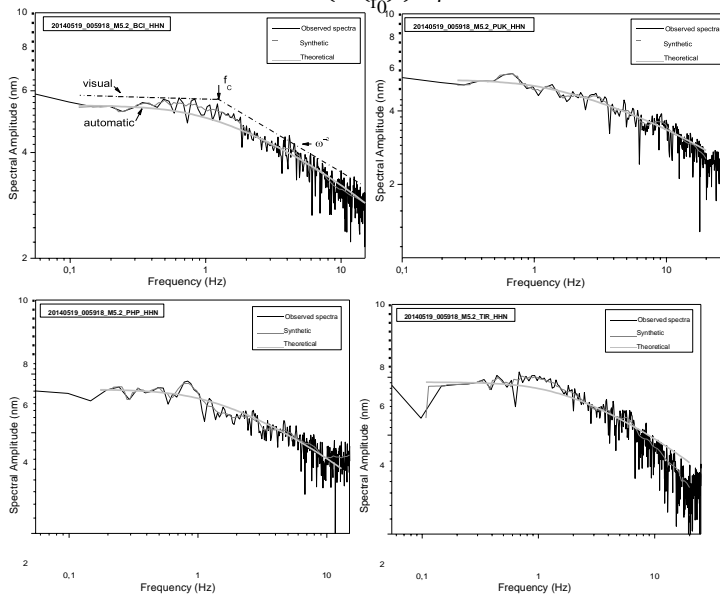

Fig. 2- Observed, synthetic and theoretical spectra obtained from spectral analysis of the May 19, 2014 (M5.2) event at 00:59 (UTC), in central Albania.

Achieved displacement spectra (Fig. 2), have been further used to determine seismic moment according to expression (3), where G (Δ, h) is the geometrical spreading function as defined by [6], which is

applied to correct for this effect depending on the slant distance from source to receiver and the wave type.

$$M_0 = \frac{\Omega_0(4\pi\rho v^3)}{(0.6)\cdot(2.0)\cdot G(\Delta,h)} \tag{5}$$

In the seismic moment expression, ρ is the medium density in the source volume ($\rho = 2.75$ kg/m^3) and v is the S wave spectral velocity taken equal to 3.6 km/s, for this wave group while Ω_0 is the zero-frequency spectral amplitude level determined through method of tangents to the zero-frequency spectrum. All the computation steps are performed using Mulplt routine in Seisan ver. 10.4[7].

Radiated seismic energy, on both horizontal components, is computed from broadband velocity spectra represented as velocity spectral density, after correcting as above. Velocity source function is obtained from displacement by multiplying with the factor $\omega = 2\pi f$, and applying the square power. The expression (5), as defined from [10],based on the discrete spectral integral in the frequency domain. Here, R represents the slant distance depending on epicenter – station distance as well as on focal depth for each of the earthquakes; Δf is the sampling interval depending on the number of samples and sampling rate. We have integrated in the frequency range 0.1-50 Hz, in order to accurately achieved 80% of the energy radiated to each direction, based on the assumption that this amount is spread in the frequency range (5 x f_c), where f_c is the corner frequency of the source spectrum. Values observed for this frequency varies in the interval 0.5-21 Hz with highest probability in the range 0.5-5.0 Hz. Radiated seismic energy is obtained thus as cumulative spectral values (Fig. 3).

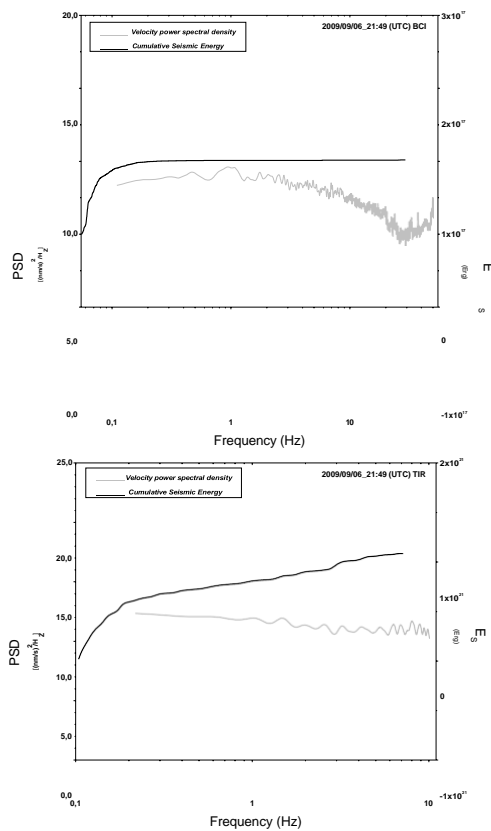$$E_S = 4\pi\rho v R^2 \sum_f [V(f)]^2 \Delta f \tag{6}$$

Fig. 3 – Cumulative seismic energy for September 6, 2009 (M_W =5.4) earthquake, computed using equation (4), respectively for TIR and BCI stations.

From the point source definition, observed directivity effect is corrected by averaging single-station energy values determined for i-th event at the j-th station, according to the expression (6).

$$E_i = \frac{1}{N} \sum_j^N E_{i,j} \tag{7}$$

Results obtained by this analyze are grouped for each zone and are listed as in the following. Five zones are defined, for each of which a given code is represented, respectively: al001-Adriatic coastal zone, al002-Ionian zone, al003-Transversal Elbasani zone, al004-Dibra zone and al005-Mirdita zone (central north Albania). Radiated seismic energy, seismic moment, scaled energy and apparent stress results are given for each of these areas (Tab. 2 to Tab. 6).

Table 2. Results obtained for earthquakes located along Adriatic coastal zone (al001).

Date y/m/d	Time h:m	Lat. NS	Lon. EW	Dep. km	Mag.	E_s (erg)	M_0 (dyn-cm)	τ_{app} MPa

Date y/m/d	Time h:m	Lat. NS	Lon. EW	Dep. km	Mag.	E_s (erg)	M_0 (dyn-cm)	τ_{app} MPa
2008/05/30	20:40	41.7	20.4	-	2.4	1.8E+15	4.0E+19	1.4
2009/06/27	23:24	40.6	19.8	4	2.6	6.0E+14	7.9E+19	0.2
2009/03/07	18:51	41.2	19.5	4	4.0	1.4E+18	7.9E+21	5.3
2008/02/06	00:52	41.4	19.6	5.1	2.6	4.0E+13	1.0E+20	0.01
2009/09/15	08:37	41.1	19.5	-	3.8	2.6E+17	4.0E+21	2.0
2009/02/28	17:36	41.5	19.6	5.2	3.5	1.1E+18	2.5E+21	1.3
2008/05/21	19:04	41.1	20.1	5.6	2.9	5.3E+16	3.2E+20	5.0
2009/03/30	19:48	41.1	19.6	6	2.6	7.3E+13	1.0E+20	0.02
2009/06/24	03:28	41.8	19.4	6	2.9	7.6E+15	2.5E+20	0.9
2008/05/18	22:49	41.9	19.5	11	3.0	6.3E+16	4.0E+20	4.7
2008/05/15	23:52	41.4	19.7	12	2.4	4.8E+15	5.0E+19	2.9
2009/03/18	16:20	41.1	20.0	12.6	3.8	2.6E+17	4.0E+21	2.0
2009/06/14	05:12	41.4	19.7	15	3.2	1.7E+16	6.3E+20	0.8
2009/04/02	05:45	41.1	19.6	15.1	3.2	1.7E+17	7.9E+20	6.4
2009/04/06	00:31	41.5	19.1	16	2.8	3.5E+15	2.0E+20	0.5
2009/03/19	15:37	42.9	18.9	16	3.4	4.5E+17	1.6E+21	0.8
2009/04/07	13:49	41.4	19.5	20.1	3.2	2.8E+16	7.9E+20	1.1
2009/04/07	16:00	41.4	19.6	25.1	2.5	3.8E+14	7.9E+19	0.1
2012/09/04	22:43	41.13	19.94	3	4.1	2.8E+18	1.6E+22	5.2
2012/12/13	21:39	41.13	19.99	6	4.2	4.7E+18	2.5E+22	5.6
2014/01/20	06:00	41.41	19.47	9	4.3	7.7E+18	3.2E+22	7.2
2014/03/08	15:12	41.51	19.52	10	4.1	2.8E+18	1.6E+22	5.2
2014/04/21	21:25	41.86	19.26	5	4.3	7.7E+18	3.2E+22	7.2
2014/12/29	20:34	41.74	19.27	6	4.6	3.5E+19	1.0E+23	10.5
2015/02/16	20:23	41.15	20.08	0	3.9	1.0E+18	1.0E+22	3

Table 3. Results obtained for earthquakes along Ionian zone (al002)

Date y/m/d	Time h:m	Lat. NS	Lon. EW	Dep. km	Mag.	E_s (erg)	M_0 (dyn-cm)	τ_{app} MPa
2008/03/05	04:08	40.2	19.8	-	3.7	1.3E+17	4.0E+21	1.0
2009/11/11	03:43	40.3	20.1	-	4.0	9.7E+16	1.3E+22	2.3
2009/01/31	12:19	40.4	19.7	-	3.5	2.8E+17	2.0E+21	4.2
2008/04/08	07:37	40.1	20.0	3.3	3.0	1.4E+16	4.0E+20	1.0
2008/03/06	06:46	40.2	19.8	4.5	3.1	4.2E+16	5.0E+20	2.5
2008/03/05	06:48	40.2	19.8	4.7	3.2	5.0E+15	6.3E+20	2.4
2009/09/17	22:53	39.8	20.2	5.1	4.1	2.6E+17	2.0E+22	3.9
2009/06/04	22:36	40.1	19.8	6	2.5	2.5E+13	7.9E+19	0.1

2009/03/11	02:48	40.5	18.8	15.2	3.7	8.1E+16	5.0E+21	4.8
2009/03/25	12:23	40.6	19.0	16	4.1	4.7E+17	2.0E+22	7.1
2009/09/13	14:03	39.6	20.1	41.4	3.5	1.6E+17	2.5E+21	2.0
2012/05/05	15:55	40.15	19.80	5	4.4	1.3E+19	5.0E+22	7.8
2012/11/27	19:06	40.75	19.86	5	4.0	1.7E+18	1.0E+22	5.1
2013/06/22	08:41	40.27	19.65	16	4.4	1.3E+19	5.0E+22	7.8
2013/08/04	23:45	40.13	20.54	0	3.7	3.8E+17	4.0E+21	2.8
2013/11/21	19:45	40.68	19.65	4	4.2	4.7E+18	2.5E+22	5.6
2014/04/06	12:56	40.71	19.58	4	3.7	3.8E+17	4.0E+21	2.8
2014/05/12	00:54	39.73	20.21	16	4.9	1.6E+20	3.2E+23	15

Table 4. Results obtained for earthquakes located around Elbasan (transversal zone) (al003)

Date y/m/d	Time h:m	Lat. NS	Lon. EW	Dep. km	Mag.	E_s (erg)	M_0 (dyn-cm)	τ_{app} MPa
2008/03/31	08:06	41.1	20.2	-	2.5	2.3E+14	7.9E+19	0.1
2008/05/14	19:17	41.3	20.3	-	2.8	4.2E+16	2.0E+20	6.3
2009/06/21	06:07	41.4	20.2	-	2.5	1.2E+17	1.3E+20	2.9
2010/05/06	13:06	41.2	20.2	1.1	3.8	8.1E+18	6.3E+21	3.9
2009/06/27	00:45	41.2	20.3	3.3	2.7	1.1E+15	1.3E+20	0.3
2009/05/21	12:11	41.1	20.5	5.7	3.0	1.7E+15	4.0E+20	0.1
2009/06/20	17:00	41.2	20.2	6.0	2.9	1.3E+15	2.5E+20	0.2
2009/06/21	17:35	41.2	20.2	10	2.8	1.7E+15	2.0E+20	0.3
2009/06/21	19:05	41.2	20.2	10	2.6	8.8E+14	1.0E+20	0.3
2009/05/21	13:26	41.0	20.4	13	3.3	1.7E+16	1.3E+21	0.4
2009/04/01	07:28	40.7	19.4	42	2.7	4.1E+15	1.3E+20	1.0
2014/05/19	00:59	40.94	19.97	1	5.0	2.6E+20	4.0E+23	1.9
2015/02/28	17:07	41.35	20.28	8	3.7	3.8E+17	4.0E+21	2.8
2015/11/01	06:26	41.35	20.27	0	4.6	3.5E+19	7.9E+22	1.3

Table 5. Results obtained for earthquakes located along Dibra zone (al004).

Date y/m/d	Time h:m	Lat. NS	Lon. EW	Dep. km	Mag.	E_s (erg)	M_0 (dyn-cm)	τ_{app} MPa
2009/01/08	12:04	41.9	20.7	-	4.6	3.3E+19	1.0E+23	1
2009/09/06	22.24	41.6	20.3	-	3.5	2.3E+18	2.5E+21	2.8
2008/06/02	08:05	41.6	20.5	5.0	2.6	4.2E+16	7.9E+19	1.9

2009/03/10	22:10	41.3	20.5	5.1	3.2	2.1E+15	7.9E+20	0.1
2009/09/07	15:20	41.4	20.4	5.1	3.7	1.0E+17	4.0E+21	0.8
2009/03/10	08:32	41.2	20.5	5.1	3.9	1.2E+18	7.9E+21	4.5
2009/09/06	21:49	41.5	20.5	5.2	5.2	1.9E+20	5.0E+23	1.1
2009/09/06	23:31	41.5	20.5	6.0	3.2	2.7E+16	7.9E+20	1.0
2009/09/07	13:04	41.5	20.4	10	3.0	2.6E+15	4.0E+20	0.2
2009/09/06	22:36	41.4	20.5	10	3.3	1.8E+17	1.0E+21	5.4
2009/09/07	12:21	41.5	20.5	12	3.3	1.3E+16	1.0E+21	0.4
2009/09/07	09:48	41.4	20.4	13	3.8	4.8E+17	6.3E+21	2.3
2009/09/07	03:52	41.5	20.5	15	3.1	6.5E+15	5.0E+20	0.4
2009/09/07	14:19	41.4	20.5	15	3.4	1.9E+16	1.3E+21	0.5
2009/09/07	00:11	41.5	20.5	15	3.4	3.4E+18	3.2E+21	3.2
2008/05/29	13:39	42.3	20.0	15	2.6	5.8E+16	1.0E+20	1.7
2009/09/06	22:01	41.5	20.5	16	3.7	2.8E+17	2.5E+21	3.3
2009/09/07	04:22	41.4	20.5	17	3.2	3.7E+15	7.9E+20	0.1
2009/09/07	04:03	41.5	20.5	20	3.1	3.9E+16	5.0E+20	2.3
2009/09/07	13:42	41.5	20.4	20	3.4	1.2E+16	1.6E+21	0.2
2013/06/30	02:47	41.50	20.47	17	3.8	6.2E+17	5.0E+21	3.7

Table 6. Results obtained for earthquakes located within north-central Albania, (Mirdita zone) (al005)

| Date y/m/d	Time h:m	Lat. NS	Lon. EW	Dep. km	Mag.	E_s (erg)	M_0 (dyn-cm)	τ_{app} MPa
2009/06/24	02:24	41.7	19.9	5.3	2.0	1.2E+13	1.3E+19	0.3
2008/05/31	11:42	41.6	20.0	16	2.8	3.6E+16	2.5E+20	4.3
2009/06/0 5	21:32	41.9	20.1	17	1.6	3.5E+11	3.2E+18	3.2
2009/03/09	00:30	41.9	20.1	20	2.3	8.0E+11	4.0E+19	0.6
2009/06/12	10:12	42.0	20.1	26	2.3	4.4E+14	3.2E+19	0.4
2008/05/27	00:44	42.0	19.9	39	2.4	5.8E+16	5.0E+19	3.5
2012/11/26	22:05	41.70	20.10	1	4.0	1.7E+18	1.3E+22	3.9
2012/11/28	01:49	42.43	20.12	6	4.3	7.7E+18	3.2E+22	7.2
2015/02/07	01:56	41.91	20.21	5	4.5	2.1E+19	6.3E+22	1

4. Discussion

Possible refinement for the local scaling relations of apparent stress is attempted, based on the additional radiated seismic energy and seismic moment, assessed through spectral analysis, as it has been described

synthesized earlier in this paper. The characterization of various tectonic domains in Albania, carried in a previous similar work, through scaled seismic energy (Graph 1), as well as apparent stress (Graph 2), has been reconfirmed. We have directly considered the ratio between the energy and seismic moment or the so called "Scaled energy", an equivalent assumption that the shear modulus of the earth medium is the same for all the earthquake sources.
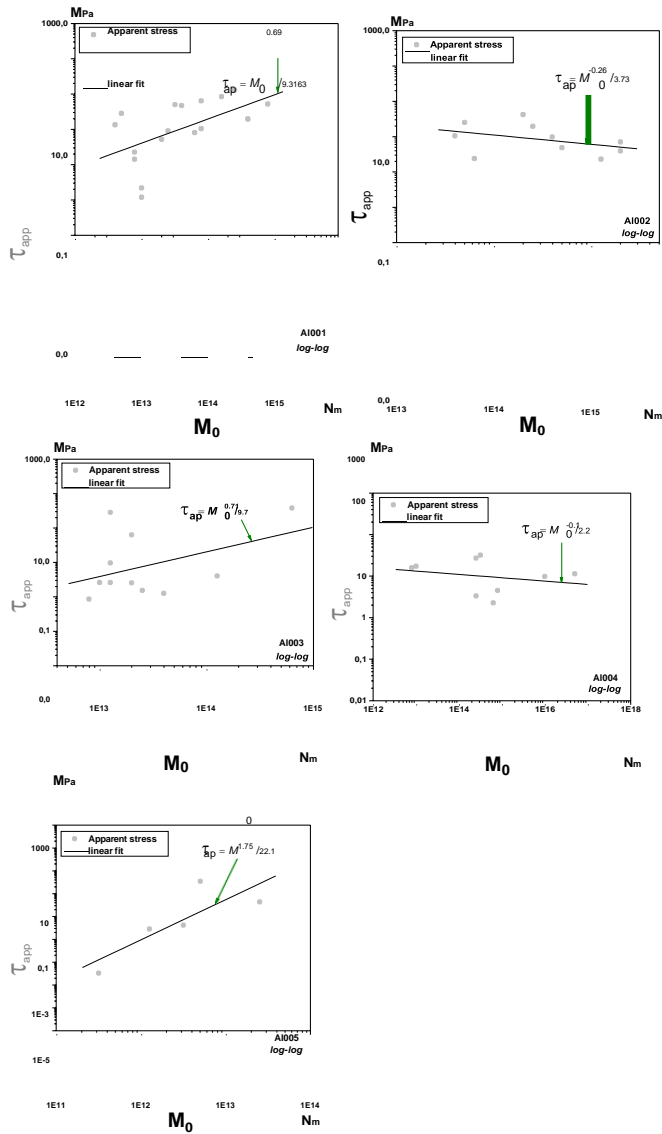
Scaling of apparent stress versus seismic moment has significant importance in the microscopic and macroscopic physics of earthquakes [11]; [8]; [15]. It shows a strong dependence on focal mechanism predomination, thus with the general natural stress field orientation, being important as a discriminator to this respect. As it is shown graphically (Graph 1), the clearly observed scaling relation between scaled radiated seismic energy and seismic moment, remained unchanged by the additional new data. In each of the analyzed zones, according to the observed results, different natural stress levels are assessed showing a heterogeneous and very complex tectonic and geological environment.

Though some of achieved values of apparent stress exceeds as much as 40 MPa, (Table 2 to 6, Graph 4), on the average they vary within the interval 0.01 – 10 MPa [6], arguing well with the global observed results [4].As we have underlined previously [16], scattering may be the influence of other source parameters, such as radiated seismic energy, and due to the point source model limitations. We have confronted new results to the considered focal mechanisms (Fig. 4), according to the areal distribution observed from different studies up to now [12]; [9]. Obtained results supports the influence of strike-slip component on different regions with thrust and normal faulting such as Adriatic zone (al001), Elbasani (al003) and Dibra zone (al005), for which it can be obviously derived higher apparent stress with seismic moment.

This result clearly supports the presence and the predominance of the obliquity of faulting in such areas, in good accordance with previous studies too (Tab. 7).
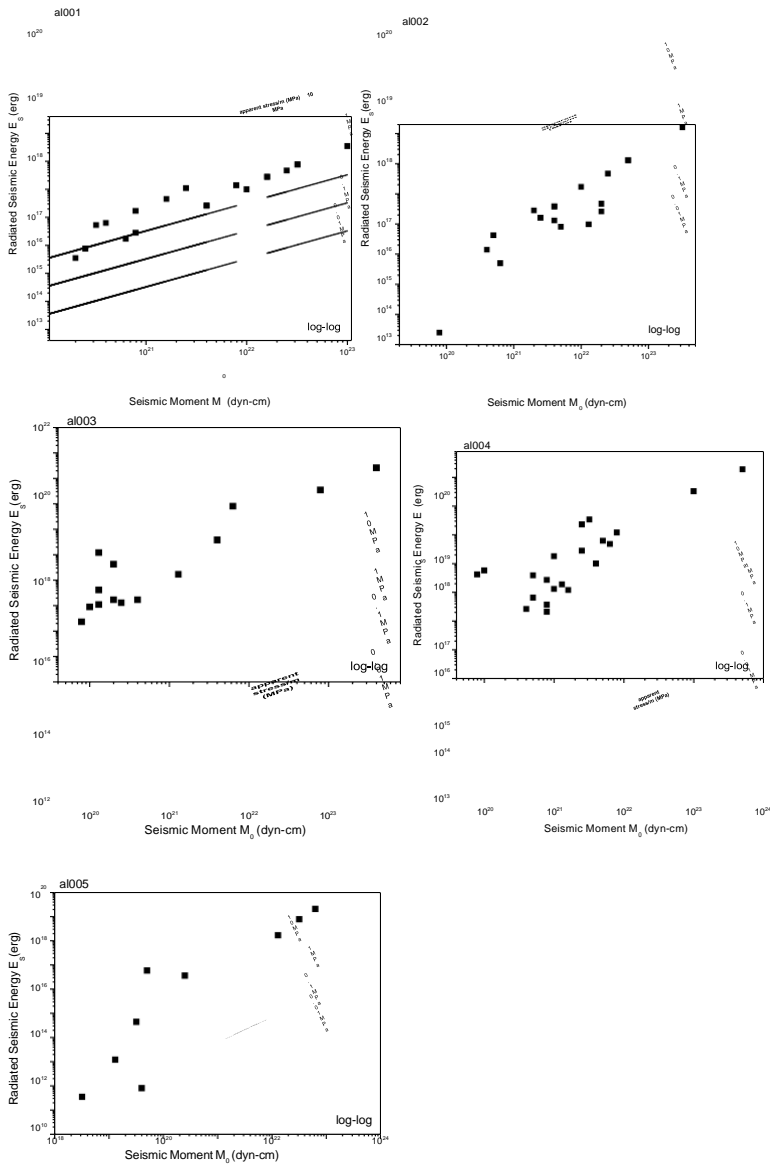
Graph.1 – Scaling of radiated seismic energy with moment for five different zones: al001-Adriatic coast region; al002-Ionian coast region; al003-Elbasani transversal zone; al004-Dibra region and al005-Mirdita region.

Graph. 2 – scaling of apparent stress with moment for five different zones: al001-Adriatic coast region; al002-Ionian coast region; al003-Elbasani transversal zone; al004-Dibra region and al005-Mirdita region.

Table 7. Variation of apparent stress related to the type of focal mechanism

No	ID	Regi.	M_0^{max} Nm	E_S^{max} J	App.Str. MPa	Scal. (M_0)	R	sd	N	Faulting
1	Al001	Adriatic	10^{14}	10^{11}	0.01-10	$\sim M_0^{0.69}$	0.6	0.7	18	Thrust (Oblique)

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2	Al0 02	Ionian	10^{15}	10^{10}	0.1-10	$\sim M_0^{-0.26}$	0.4	0.4	10	Thrust
3	Al0 03	Elbasan	10^{14}	10^{11}	0.1-10	$\sim M_0^{0.71}$	0.4	0.9	11	Normal (Oblique)
4	Al0 04	Dibra	10^{16}	10^{13}	0.1-10	$\sim M_0^{-0.1}$	0.2	0.4	9	Normal
5	Al0 05	Mirdita	10^{13}	10^9	0.001-10	$\sim M_0^{1.75}$	0.8	0.9	5	Normal (Oblique)
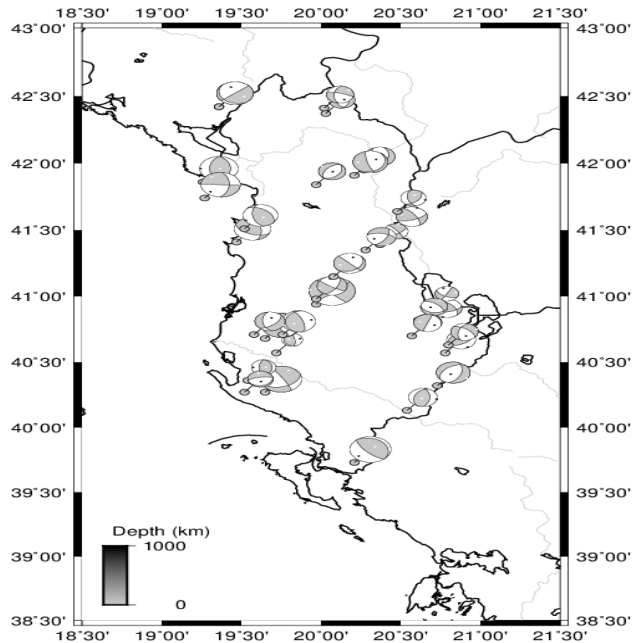
Fig. 4 – The distribution of focal mechanism for the Albanian territory

5. Conclusion

We conclude, as in the following: It is clearly achieved different natural stress level for each of the different areas, dependent on the heterogeneity in geological and tectonic pattern; Apparent Stress varies within the interval 0.01-10 MPa, with some exception when lower and as well higher values are also observed. Assuming a point source model, self-similarity and a common shear modulus according to [4],

achieved apparent stress values are in accordance with the ones globally determined (0.03-6.69 MPa);Scaling relations for apparent stress, with the Seismic Moment, are determined although poorly statistically observed, as worldwide observations, as regarding to the faulting type distribution; Our results do support a complicated scaling model as the influence of the obliquity of faulting and the presence of a strong strike-slip component especially along the transversal fault zones.

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THE UNIFORM DISTRIBUTION OF DOSE ON TUMOR VOLUME

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Abstract

In the radiotherapeutics treatment, our mission is to scatter the dose in uniform way to tumor volume and save healthy organs by radiation. To realize our purpose in our daily work we must to control the parameters of our device in periodic time. The wedge is part of this periodic control. In the linear accelerator head is located wedge, which used to modulate amount of dose around the tumor which we will treated, so it helps us to distribute the dose in uniform way in the surface of the tumor. We are interested for this because when the tumor is given a radiation dose, the chance of control tumor is related with uniform distribution of the dose on tumor volume. It is very important for us to measure the distribution dose on surface of tumor, which is reduced by wedge so we can calculated the treatment planning in the correct number of MU. In this paper we will present some measurements for wedge factor, where we have used a radiation beam with energy 6 MV, so our purpose is to treat correctly the tumors when we use a such beam. The measurements are realized for wedge factor for the field size 3×3 cm^2, 5×5 cm^2, 10×10 cm^2, 15×15 cm^2 and 20×20 cm^2 25×25 cm^2. We have used a PMMA phantom. With these measurements we have formed a graph, which gave the dependence of wedge factor from field size. By the graph saw that increasing of field size, has increasing effect on the wedge factor.

Keywords: Dose, tumor, radiation, accelerator.

1. Introduction

We use the radiotherapy to treat the tumor cells but we must be careful with healthy cells during the exposure by radiation dose [1]. The main factors that have impact in the radiotherapy results are the tumor type, its anatomical position, the geometric size of the tumor and the accuracy with which a calculated radiation dose is transmitted to the tumor[2]. The radiotherapy is not onliest technique to treat the tumors but it combined with other techniques such as surgery and chemotherapy. It can be used before surgery by reducing the size of the tumor and making it easier to remove the tumor or radiation can be used after the operation destroying the tumor cells left over. The linear accelerator is main device that used in treatment cancer patients [3]. We are interested to treat every part of human body so we use linear accelerators to send radiation with high energy to patient's tumor. The X-ray is a radiation with high energy, it has a hard effect to damage cancerous cells. The wedge help us to change the shape of radiation profile, it is located in the head of accelerator.When a treatment plan requires the use of the wedge filter. At first we send a given dose of radiation to tumor volume using a software but we noted that distribution dose is not uniform so we used a wedge to create a uniform dose, then apply it to patient after we have built the treatment plan. It is very important for us that to have a uniform dose in all of tumor volume [4]. The important characteristic of wedge is its angle, which define the angle between the isodoseline distributed by perpendicular axis with the central axis of the beam [5].

2. Methods and Materials

When the intensity of dose is in a high level, we must reduce it, so we set the wedge in the path of radiation as result we have a reduction of photon intensity that measured in the central axis at the reference depth compare with measurements in an open beam or without a wedge in its path.This weakening should be taken into account in the dose calculating. The wedge coefficient term is used to determine the amount of intensity that is reduced by its presence [6].We took a fixed field size and did some measurements of the wedge factor, which defined as the ratio of the dose taken to the phantom in the presence of the wedge and without its presence in the depth where the maximum

dose is taken. These measurements helped us to create a clearly idea on the wedge factor with purpose that it used during the radiotherapy treatment and we have the needful intensity of beam. So, the wedge filter reduces photons of the primary beam and contributes to a significant amount of distribution of the photons for the treatment, the wedge factor is a function of the field size and depth of the phantom where measurements are performed [7]. We use an automatic filter, which is a single physical wedge (60^0), so to derive the desired angles from 0^0 to 60^0, we combined the delivered MU with the presence of the wedge and without its presence.It is located inside head of linear accelerator and is placed over multi-leaf collator (MLC). The absorbed dose is measured on the PMMA phantom through the ionization chamber as a function of the field size. The distance source-surface is 90 cm. In this treatment, the sizes of the areas considered are: 3×3 cm^2, 5×5 cm^2, 10×10 cm^2, 15×15 cm^2, 20×20 cm^2 and 25×25 cm^2 for 6 MV energy.It is located 8.7 cm PMMA plates with 1.19 g/cm^{3}density, over the farmer detector [8]. The detector connect with the electrometer during the making of measurements. The measurements gave a good information about radiation distribution with presence of wedge and without its presence in it.

FIGURE 1. *Photo of Elektra Linear Accelerator*

3. Result and Conclusions

We have done some measurements of the wedge coefficient for each field dimension, which determined as ratio of dose in different field size in presence of wedge and without its presence for the beam energy of 6 MV.

Field (Cm^2)	3x3	5x5	10x10	15x15	20x20	25x25
6MV	0.256	0.257	0.263	0.266	0.275	0.281

TABLE 1. T*he values of wedge factor*

From the data of the above table it was created the graph below (Fig 2).
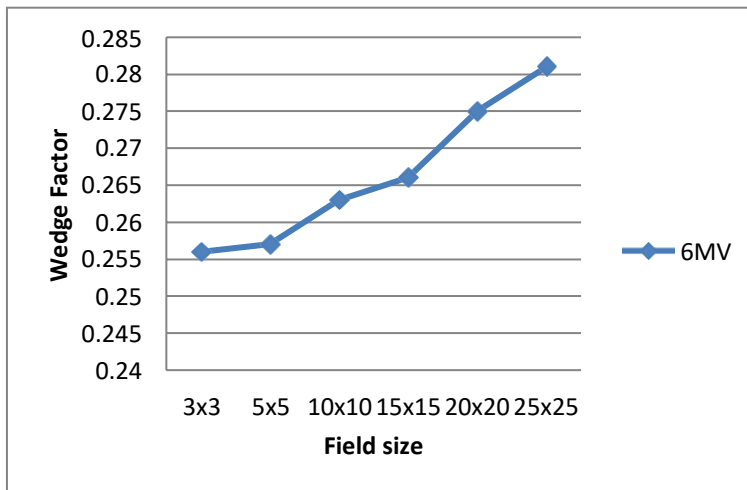
FIGURE 2. T*he relation between field size and wedge factors*

We noticed by the graph that increasing the size of the radiation fields increases the values of the wedge coefficient. The distribution of photons by the collimator of the linear accelerator and the distribution of photons by the phantom are the main factors that affected in the high values of the wedge coefficient.
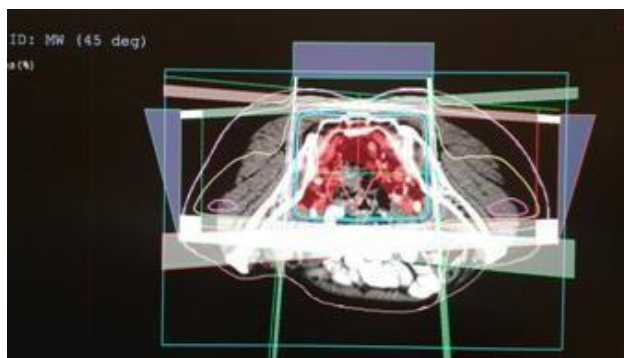
FIGURE 3. *The dose distribution for pelvic with wedge*

At figure 3 is showed the case of pelvic treatment where is used wedge to reduce the radiation dose in different parts of tumor volume with pulpous that the dose to distribute in the uniform way on all the surface of tumor. This method gives us the opportunity to control the dose distribution in a better way and obtaining a better distribution of the dose. The wedge properties such as dose modification of the dose in the patient's body and uneven distribution compensation from the contours of irregular tumor surfaces are utilized by various types of linear accelerators to provide homogeny distribution of the dose through tumor so to have effective treatment in radiotherapy. The results are used in calculating the dose to be given to the patients.

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THE IMPACT OF RELIGIOUS ORTHODOX FASTING ON THE METABOLISM OF CALCIUM, PHOSPHATE AND PARATHYROID HORMONE IN A GROUP OF HEALTHY ADULT SUBJECTS

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Abstract
A strict diet, with no consumption of animal products is similar to a vegetarian diet. Fasters abstain from dairy products, eggs, and meat every day.The individuals which are included in this study, have undertaken voluntary the initiative to be involved in this food regimen for 40 days. This food regime is repeated at least three times a year.
Through this study, we aim to highlight the potential impact of this food regimen on calcium metabolism in normal individuals (healthy subjects). 97 randomly selected individuals are included in this study (39 of them as control group). Their age varies from 18 to 57 years old. The study is realized from October 2013 to May 2018.
A 10 ml fasting blood sample was collected in pre-chilled tubes from each subject at the beginning, middle and at the end of the fasting period. PTH were measured by IMMULITE 1000 Immunoassay System and serum calcium and phosphate on Alpha 25 Biosystems. We have carefully observed the changes in the values for each of the above mentioned parameters. We observed an increase in serum PTH concentration in the middle of the fasting period, which continues until the end of the fasting period. This increase in serum PTH values comes as a result of low calcium concentration during the fasting period. The situation is normalized after the end of the diet, which is clearly seen in the surveys carried out a week after the end of the fasting period.

Calcium and PTH values are normalized, while values of serum phosphorus concentration does not seem to be significant despite small changes in some individuals.

Keywords: PTH, hyperparathyroidism, fasting period, hypocalcaemia, serum phosphates.

1. Introduction

The religious orthodox fasting, is a food regimen similar to vegetarian diet. Orthodox fasting involves 180-200 days of fasting per year (1). Fasters abstain from dairy products, eggs, and meat every day. Also, fasters abstain from fish and olive oil on Wednesdays and Fridays during this period. During Lent (48 days), fasters abstain from dairy products, eggs, and meat every day (2). This diet consists largely of bread, fruits, legumes, nuts, seafood, snails, and vegetables during fasting periods (3). According to some studies, Ramadan fasting is associated with variable metabolic & endocrine changes in human (3, 4,5, 6, 7). Previous findings showed that serum calcium concentration have been reported normal or decreased in fasted subjects (6, 7). There are no data on the impact of orthodox fasting in parathyroid glands physiology. In terms of vitamin and mineral intake, both riboflavin (9) and calcium (8, 9, 10,11) intake decrease during fasting periods. On the other hand, magnesium intake increases during these periods (8, 11).The aim of this study is to investigate the effect of religious orthodox fasting on serum calcium, phosphorus and parathyroid hormone (PTH) in human subjects. This idea came up as a result of a random observation and measurement of PTH, blood calcium and phosphates in a group of healthy individuals. Many of this individuals resulted to have increased levels of PTH and sometimes increased levels of calcium in their blood too. After reviewing the information for each person and contacting them, in order to get some more information about their daily routine and life style, resulted that a considerable part of them were fasting (Easter fasting period) when collected the blood.

2. Materials and methods

A group of 97 randomly chosen individuals was enrolled in this study during the period of time from October 2013 to May 2018. The control group, were represented from 39 randomly chosen individuals, 24

females and 15 males, 37 (±11.7) years old, while the group of fasters, were represented from 58 individuals, 23 male and 35 female, 39 (±10.9) years old. All details of the clinical and biochemical parameters of these patients were recorded, as well as other details on their fasting regime and their life style.

A 10 ml fasting blood sample was collected in the morning, from 8.00 to 10.00 a.m., in pre-chilled tubes from each subject at the beginning, middle and at the end of the fasting period. PTH, calcium and phosphates were measured and monitored regularly in all the participants included in the study and in a subgroup of them, the active form of vitamin D was monitored also. PTH and vitamin D, were measured by IMMULITE 1000 Immunoassay System and serum calcium and phosphate on Alpha 25 Biosystems. The reference value of PTH was from 15-65 mg/dl (normal), the reference value for serum calcium, was 8.6-10.2 mg/dl and for serum phosphate it was 2.6-4.5 mg/dl.The reference values of vitamin D, used in this study are as follows: <20 ng/ml (deficiency), 20-29 ng/ml (insufficiency), 30-100 ng/ml (sufficiency) and >100 ng/ml (increased).

A dietary interview was used to estimate the daily intake of various dietary factors, including calcium, phosphorus, magnesium, vitamins and macromolecules (carbohydrates, proteins and lipids) on the basis of foods and beverages that participants consumed during this period of time and more specifically, during the last 24-hour period preceding the interview (midnight to midnight).

All data from this study, were analyzed through SPSS 20.0 for windows. The results are presented as mean ± standard deviation (± SD) and P-value considered significant ($p < 0.000$).

3. Results and discussions

Fasting human subjects were in the focus of our study. For that reason the study was conducted during the orthodox fasting months of the year in continuity and repetitively for five years. High parathyroid hormone (PTH) levels were observed during the fasting period, mainly during mid fasting period, reaching maximal values of intact serum PTH (110±45.17 pg/ml) and with low-normal serum calcium levels (8.4±3.9 mg/dl).

Table 1. Pre, mid and end-fasting period data on PTH, calcium and phosphate levels in the group of fasting subjects

Parameters	Pre-fasting	Mid-period	End-fasting
PTH (pg/ml)	66±29.37	110±45.17	97±27.19
Calcium (mg/dl)	8.9±3.5	8.4±3.9	8.5±3.7
Phosphates (mg/dl)	3.5±1.7	3.72±1.5	3.61±1.9

Although PTH secretion is controlled by the serum calcium concentration, it is also important to recognize that through its calcemic actions, PTH regulates the serum calcium concentration. For full understanding of the dynamics of PTH secretion, it is first necessary to appreciate the bifunctionality of the PTH–calcium relationship. As such, the serum calcium concentration controls PTH secretion while simultaneously PTH regulates the serum calcium concentration (14).This increase in serum PTH at the middle of fasting period is due to the decreased level of calcium, mainly as a result of low daily calcium intake (daily dietary calcium intake). Other studies held on healthy human subjects mention that: "Dietary calcium intake, serum calcium, and serum 25 (OH)D were inversely associated with PTH level across all races" (15).The increase in serum calcium at the end of fasting period stimulates the release of calcitonin and inhibition of the release of PTH via negative feedback mechanism (13) and the bifunctional mechanism of regulation of calcium and PTH concentration (14). Other studies showed that consumption of moderately low amounts of dietary protein (0.7 and 0.8 g/kg) stimulates the PTH-1-a-hydroxylase axis within 4 days in young healthy women consuming an otherwise well-balanced diet (16). These changes are not observed in the groups with consumptions of higher protein amounts. Based on these findings, daily amount of protein intake is also another important factor, affecting the level and the metabolism of PTH in healthy human body. This religious fasting periods, are characterized by low protein intake, which possibly can affect the level of serum PTH. The precise mechanism by which low dietary protein impairs intestinal calcium absorption remains unknown. The long-term consequences of restricted protein intake on calcium and bone metabolism are also unknown but could potentially be an important and unrecognized problem (16). Studies on rats, treated with high phosphate diet and decreased food intake, show that high phosphate

diet has several effects on calcium and phosphate metabolism and PTH secretion, which is linked with bone resorption and increased incidence of nephrocalcinosis on the other hand (17). Based on these findings, the need and importance for evaluation and measurement of bone turnover markers and kidney calcium, phosphates as well as other markers, parallels with this strict regime arises. Studies in pregnant heifers and pregnant cows, kept under a controlled diet regime, suggestthat age is an important factor to be taken into consideration regarding the metabolism of calcium, phosphates and PTH. There was no correlation between hypocalcemia and loss of calcium in colostrum or milk. Feeding low dietary calcium to cows in the prepartum period was effective in the prevention of severe hypocalcemia at parturition, but no effect was observed in heifers. But, on the other hand, results indicated that heifers, but not cows, were able to achieve calcium homeostasis after parturition when fed excess dietary calcium before parturition (18). According to other studies, numerous factors not classically associated with calcium–phosphorus homeostasis are independently associated with PTH and should be considered in future studies of PTH and chronic disease (15). Observations on the effect of Ramadan fasting on PTH hormone and serum calcium and phosphorous, results in similar findings (13), although there are different ways of fasting and different abstentions. During religious orthodox fasting, there is abstention of dairy products, eggs, and meat for 180-200 days per year as mentioned above, while during Ramadan there is abstention from food and drink from dawn to sunset. Although there are no abstentionsregarding food variety, long hours of abstentions from food and beverages, can be an indication of receiving the same results.

In conclusion, we can say that there is a significant impact of fastingin PTH and serum calcium in normal healthy human subjects, but no insignificant impact on serum phosphates.More parameters should be analyzed and more studies are needed to corroborate these findings.

4. Limitations of the research

Due to the nature of this research, some limitations should be noted. Other parameters, like active form of vitamin D, protein intake and other factors linked to bone remodeling and mineral metabolism, are important for a better and fully understanding of dietary effect on

mineral and PTH metabolism in healthy human subjects. Data received from the measurements of active vitamin D in the blood are not presented in this study, more measurements are needed for proper statistical analysis.

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THE USE OF SOME MODERN PHYSICAL ELEMENTS FOR THE STUDY OF MATTER STRUCTURE IN CHEMISTRY TEACHING

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Abstract

The quantum mechanical model of atomic construction, helps to explain the behavior of electrons in the teaching of chemistry. An atom's electron is responsible for the chemical and physical properties of the atom, therefore, the model of the quantum mechanics is important for understanding the construction of the atomic structure. The focus of this study is based on the usefulness of using quantum chemistry and their effective use for successful teaching. Based on the methodology followed in the study of chemistry, we bring attention to the choice of quantum concepts teaching for the impact it has on educating the learners with a quantum model of chemical behavior. The study aims to highlight the usefulness of quantum mechanical concepts using in the treatment of atomic structure theories by using the quantum orbital numbers that show, how much the energy level in the electron is. It was found that the effective use of quantum mechanics, minimizes the gap that existed in understanding the construction of the atomic structure and mechanism of atomic actions. The paper contributes to effective chemistry teaching by providing a tool for learning, evaluating, and understanding the meaning of chemistry through quantum visual and textual ways.

Keywords: Electron, atom, quantum mechanics, energy, atomic orbit.

1. Introduction

Quantum theory is a successful theory of physics which describes, correlates and predicts the behavior of subatomic systems (Merzbacher,1990).However, to describe this behavior we will take some moments to review the steps that led to twentieth-century revolutions when some of the most fundamental concepts of the nature of matter and its behavior were overturned and replaced with a new description of weird but powerful.

The basic models of modern chemistry describe the behavior of electrons in atoms and molecules, and provide a statistical interpretation of thermodynamics. Both of these are based on a quantum model of physical behavior. For this reason, a quantum interpretation of chemistry provides a unifying pattern that cuts all chemical behavior. Epistemologically, the sciences rely on and call on fundamental patterns to put forward research questions and to interpret empirical results. As a science develops, emerging patterns sometimes change dramatically. Moreover, the model becomes a codifying for future scientists in contemporary textbooks / curriculum materials (Kuhn 1970). Is seen that students think the uncertainty relation is a consequence of the measurement process, something that has already been reported in literature (Styer, 1996; Johnston et al., 1998; Muller & Wiesner, 2002).

2. General considerations for mechanical quantum chemistry teachings issues

2.1 The atom models

According to Democritus, the Greek philosopher, the matters that surround us are constructed from very small particles. He thought these particles were inseparable, so they were called atoms. A chalk piece is divided into two parts. Each of the parts is split again into small pieces. There comes a moment by Democritus, the particles cannot be split in smaller parts. This is the chalky atom..

According to Democritus, various substances are composed of different atoms. Water consists of water atoms, wood from wood atoms, and therefore the substances are different. Democritus imagery

is good for time, but it is not entirely correct. We know that water, chamois, or wood is not made up of water atoms, chalk or wood, but molecules or crystals.

Democritus was not right when he thought of inseparable atoms, but his image of atoms as very small particles was correct.

Later,Thomson played with cathode rays. These are just beams of electrons. By having the beam interact with electric and magnetic fields, Thomson was able to determine the mass to charge ratio for an electron. So, from that he knew that the electron came from the atom, it had a negative charge and a small mass.The first experiments that showed that the atom is not an inseparable particle were those of the passing of the electric grid in the gassed gases.

In a glass funnel are placed two electrodes, the cathode connected to the negative pole of the current source and the anode connected to the positive pole. At each of the two electrodes, a high potential difference is exercised. Between the two electrodes there is an electric discharge that is getting weakened by decreasing the pressure of the gas filling the tube. When the pressure drops sufficiently, the tube illumination disappears and a fluorescent light is displayed in the opposite position on the cathode. This phenomenon was explained by the action of particles emerging from the cathode and moving towards the anode, which were called cathodic rays.
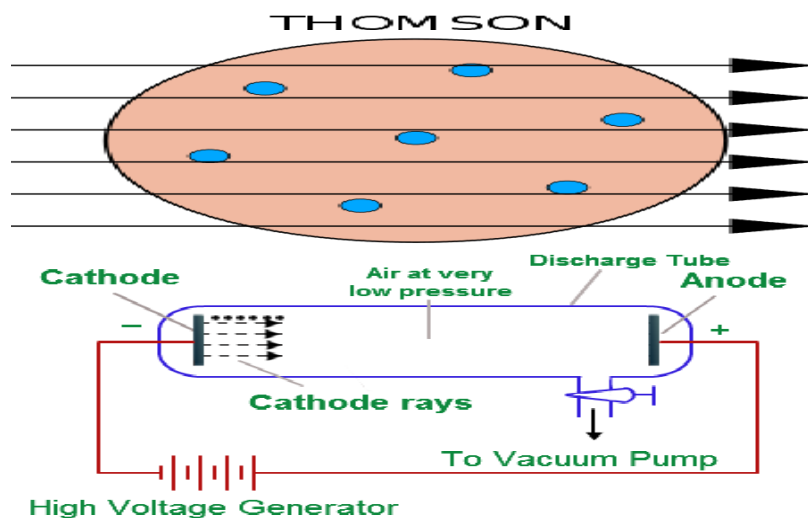
Figure 1.Thomson atomic model   Figure 2. Obtaining cathodic rays

2.2 Construction of the atom according to Rutherford

The atom is a particle without electrical charge. Once the electrons were discovered, it was understood that the atom contains electrons, but since the electrons are negatively charged, there are other positively charged particles in the atom, so that the atom will result in electrolysis. How are these particles located in the atom? To answer this question, the English physicist Rutherford, at the beginning of the last century, carried out the experiment of bombarding gold-leaf gold plates.

Starting from the results of this experiment, Rutherford proposed this model for the atomic structure: in the center in a very small volume, almost all of the atom's mass was centered on what is called the nucleus and is positively charged. The core wheel, far enough from it, moves the electrons on the trajectory that Rutherford thought circular and called the orbits of the electron. This pattern resembles the Solar System: electrons move around the nucleus as the planets move around the Sun.

Rutheford proposed that electrons move in circular orbits. Electrons move in orbits at such speeds that the electric pulling force, exerted on the electron from the nucleus, is neutralized by the center of gravity. Later it was found that the nucleus is positively charged since it contains proton and the number of protons having an equivalent load to the electron, but the opposite sign equals the number of electrons moving in the orbits of the circular. Consequently, the atom is electron beam, so no electric charge.

The atomic number Z indicates the number of protons in the nucleus and the number of electrons that move around it. For example, the atom of the hydrogen atom is composed of a proton and its rotation moves an electron, so (Z = 1). The electron has a very small mass of protons, and the mass of the hydrogen atom is approximately the same as the mass of the protons. The carbon atom has 6 protons, 6 electrons and 6 neutrons. Two electrons are found at the first level and the other 4 are in the second electronic level.
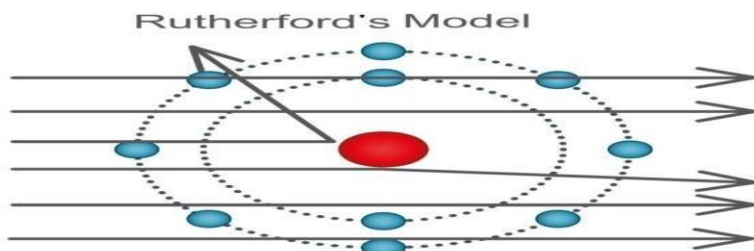
Rutherford's Model

2.3 Building the atom according to Bohr

The model proposed by Rutherford was not sustainable over time. The experience showed that the atom is a viable system. To explain this consistency, Danish physicist Niels Bohr proposes a new theorem for atomic building, which is a further development of Rutherford's theory. According to Bohr, the electrons do not move on any orbital circular, but only in circular orbits that have a certain distance from the shrub, meaning some beams. These are called orbits allowed.

Just by moving in these orbits, the electron does not radiate energy into the surrounding environment, so it does not lose its energy. Allowed orbits are indicated by number n, called base number, and get full values, i.e. N = 1, 2, 3. The closest orbit to the nucleus is indicated by the number n = 1, the second with n = 2, and so on. When the electron moves to the orbit close to the nucleus (n = 1), the atom has the lowest possible power E1. When the electron moves to the second orbit (n = 2), the atom has a certain E2 energy, but greater than E1, (E2> E1) and so on. Some of the energy values that an atom takes when electrons move to different orbits are called energy levels and electrons belonging to the energy level form an electronic layer.

In the atom of an element, the distribution of electrons through the energy levels and sub-levels is done according to the principle of stability. According to this principle, the electrons are first filled the lower energy levels and then with higher energy.
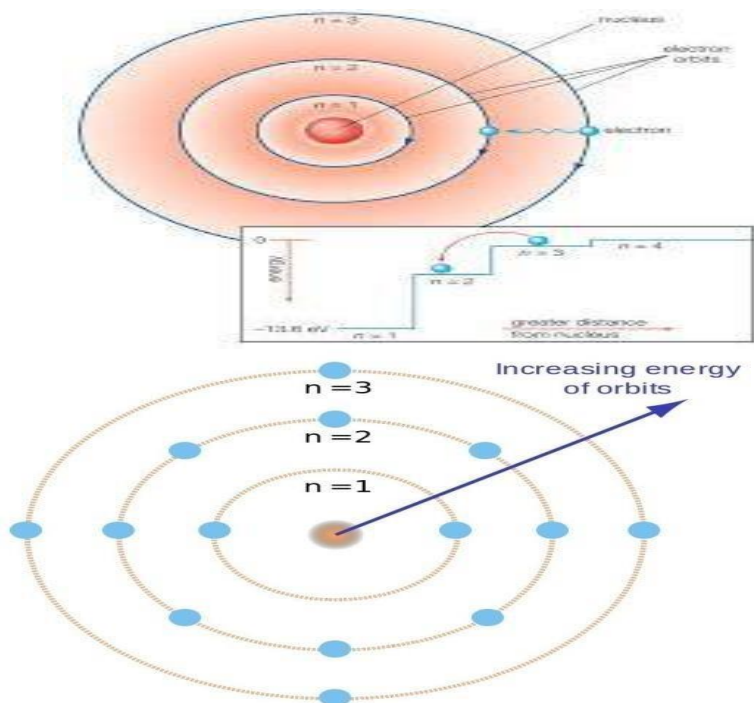
Figure 5. Bohr model of atom

3. Elements of quantum mechanics to be considered for effective chemistry teaching:

The quantum mechanics concept is quite wide. It is used in various fields of life, in social sciences, in the sciences of nature and beyond. By researching, finding and studying literature in this field, through the compilation and implementation of the relevant methodology based on the competences of the field of natural sciences, it was possible to compile this scientific paper. The course does not think that this work has exhausted everything, as there are still elements where it is necessary to conduct in-depth and specific studies.Let this work serve as an incentive for further scientific research in such a wide and problematic field.

In order for the quantum chemistry model to be properly supported within the chemistry curriculum, this research is part of a project to design software's and teaching materials to provide a coherent introduction to quantum concepts at an early stage of the university

curriculum. Our goal is to develop the materials that will be most supported in the teaching of quantum theory.

In introducing our development work, we have found that many students and teachers admit that using quantum mechanics in chemistry is not what they wanted to be.

Science is an intellectual and practical activity that involves systematic study of the structure and behavior of the physical and natural world through observations and the use of appropriate study methodology. Natural science teaching offers students the opportunity to develop the understanding of the concepts and the scientific processes of man-made practices for the development of scientific knowledge, the contribution of science to society and its applications throughout life.

The science curriculum helps develop the competences that individuals serve in personal, social and economic terms, and embark on the local and global issues.

Since the process of learning in natural sciences relies on scientific research, the most important factors for a successful learning are the methods, techniques and strategies of learning. Their selection and use by teachers is done in the function of developing student competencies, while respecting the different learning styles.

The beginnings of the Quantum Mechanics were laid down in the IX century with the discovery of Thomas, Rutherford and others. However, her birthday is owed to Max Plank's hypothesis. In the early twentieth century, physicists were trying to make a theoretical formulation of radiation. Radiation treatment provided unsatisfactory answers. Relays and Jeans came to the conclusion that the energy inside a hole that has radiation must be endless. The problem was that these physicists relied on the hypothesis that the energy of the radiation comes continuously. The solution came from Planku who threw the hypothesis that energy exchange becomes discrete. This hypothesis abandoned the endless answers and managed to give a satisfactory qualitative explanation of the radiation phenomenon. The next step was taken by Einstein, who used Plank's hypothesis to reach a connection between energy and mass.

At the same time Erwin Schröderinger and Werner Hajzenberg created two different formulations of what would in the future be known as Quantum Mechanics. Hajzenberg created the Matrix Mechanics, a formalism where the system is abstracted through operators into an

abstract vector space. Schröderinger on the other hand managed to formulate an equation that controlled the timely evolution of a system. In the coming years it was found that Schröderinger and Hajzenberg's formulations are equivalent.

4. Attempting for a unified theory

Many distinguished physicists and chemists have worked to reach one of the "great unifying theories" that combine not only the numerous models of subatomic physics but also the four basic collaborative forces that emerge: strong strength, electromagnetism, weakness of force and gravity.

4.1 Quantum Mechanics and Classical Physics

The quantum mechanics predictions are experimentally verified with a high degree of accuracy. So the current version of the correspondence principle between quantum and classical mechanics states that all objects obey the laws of quantum mechanics, according to this principle classical mechanics is simply a version of quantum mechanics for large systems (or a quantum statistical mechanics for one large number of crumbs). The fundamental difference between classical theory and quantum theories is mentioned in Einstein's paradoxical experiment.

So, in essence, the difference is in the assertion that quantum mechanics is coherent (amplitude collection), whereas classical theories are incoherent (intensity gathering). So sizes such as length of coherence and coherence times go into operation. For microscopic bodies, the expansion of the system is naturally much smaller than the length of coherence; for macroscopic bodies is expected to be the opposite. This is in line with the following observations:

Many "macroscopic" features of classical systems are the direct consequence of their parts. For example, the durability of the matter (consisting of atoms and molecules that would be subject to collapse under electric forces), the material's rigidity, mechanical, thermal, chemical, optical and magnetic properties of the subject are all results of the interaction of electrical load under the rules of quantum mechanics.

This exotic behavior of the subject assumed by quantum mechanics and relativity becomes more apparent when dealing with small particles

moving at very high speeds, while on the other hand the classical laws of "Newtonian" physics are still valid for predicting the behavior of system of "large" objects that move at much smaller speeds than light. There are many mathematical formulas of quantum mechanics that are mathematically equivalent. One of the oldest and most usable formulations is the theory of transformation proposed by physicist Pol Diark, which unifies and summarizes the two earliest formulations of quantum mechanics, matrix mechanics (formulated by Werner Hajzenberg) and value mechanics formulated by Erwin Schrödinger). In this formulation, the instant state of a quantum system which are absurd sizes encodes the probability of the properties that can be measured. Examples of observable sizes include: energy, position and angular momentum. Generally, quantum mechanics does not give definite values to observable sizes. Obviously these probabilities will depend on the quantum state of the system at the moment of measurement.

In quantum mechanics there is a wavelength-particle duality, so the cluster properties can be described as a wave. So its quantum condition can be presented as a wave, with an arbitrary form extended over the entire space, which is called the wave function.

4.2 Mathematical formulation

The time-independent Schrödinger equation can be expressed in highly compressed mathematical shorthand as:

$$\hat{H}\,\Psi = E\,\Psi$$

Hamiltonian Operator (Energy operator)   Energy eigenvalue

in which the operator corresponding to the total energy of the system produces time evolution.

For hydrogen atoms, spherical polar coordinates are more suitable, hence:

$$\frac{-\hbar^2}{2m}\nabla^2\Psi(\mathrm{r}) + V(r)\Psi(\mathrm{r}) = E\Psi(\mathrm{r})$$

Kinetic Energy + *Potential Energy* = *Total Energy*

The sum of the Wave Function's Kinetic Energy and Potential Energy = The Wave Function's Total Energy.

The internal product between the two states vector is a complex number known as the probability amplitude. During a measurement, the probability of a system collapses from an initial state to a given "eigengjisma" given by the square of the absolute value of the probability amplitude, between the final state and the initial state.

The Schrödinger equation acts over the entire probability amplitude, not only of its absolute value. While the absolute value of probability amplitude encodes information about probability, its phase encodes information about the interference between quantum states. This leads to the quantum values behavior.

Another method is the "semi-classic movement equation", which applies only to systems for which quantum mechanics are associated with small deviations compared to classical behavior.

Material and methods

For the realization of several teaching classes in the chemistry course was used as the main didactic method, the use of quantum mechanics for the study of the atomic structure. A questionnaire with the students is then carried out on the effectiveness of using quantum mechanics in the study of the atomic structure during its study in the high school curriculum.

The process was realized through the instructions given to second-year master's students in the Biology and Chemistry branch of the "Fan S. Noli" University of Korça; Faculty of Natural and Human Sciences during the course of their teaching practice at the high school "Abdulla Progeri" in January-February 2018.

Objectives

The main objectives of this study are:

> ➢ To investigate the student's understanding the use of basic concept of quantum mechanics and their conceptual difficulty on this concept.
> ➢ Identifying the importance and analysis of the concepts of quantum mechanics in the teaching of chemistry.
> ➢ Determining the effectiveness of using quantum mechanics in studying the structure of the atom during its study in the high school curriculum.

Results and discussions

From the realization of the questionnaire with the students of "Abdulla Progri" school, we came to the following results, which are presented below.

5. The importance of quantum concepts

The first question of the questionnaire was:a) Please make a list of the essential concepts of the general chemistry you want to possess in order of order. b) Please count as important as 1, 2, 2, and so on. You may need to list some concepts of equal importance.

This question was intended to determine the relative importance of quantum concepts in the high school chemistry curriculum.

Results

Five of the respondents placed topics that are either implicit or explicit quantum mechanical in nature approximately in the middle of the list, with the average number 5.The second respondent wrote that "it cannot be listed them in terms of importance", so to give you rankings, here's the list of two line items explicitly mention quantum ideas.

The sixth number stated that the development of students' reasoning skills was its main objective and provided a list of metacognitive objectives.

Concept/ Answer	Period	Chemical bond	The principle of Heisenberg	The pr. of Paul	The conf. of electron	Atomic specters	Hyd. atom
1	3	4					
2*		4	7	7	7		
3	5				5		
5		3	5		4		
6		6				5	5

Table 1. Essential concepts of chemistry.

What should the students know?
The second question of the questionnaire was: What should know the students?
We asked the students: "What are the essential quantum concepts that should be included in the core curriculum of high school chemistry? Please explain why each quantum concept in your list is essential?"

Results
The answers showed the more detailed expectations of the student's knowledge of quantum concepts than was evident from the order of chemical concepts. If we combine the answers to the first two questions, then 5/6 of students list orbits and link theory under quantum concepts that are expected to be included.
The consecutive concepts supporting these two are explicitly mentioned rarely (3/6 The Principle of Paul, 3/6 quanta numbers, 2/6 levels of energy), but it is not unreasonable to assume that these concepts are embedded with orbital and links.
4/6 of the students were clear about the relationship between these quantum concepts and the periodic table. A little surprising was the lack of mention of spectroscopy (3/6) and the nature of the light wave (1/6). The nature of light particles also refered to little (2/6).

It is possible that respondents interpret the word "concept" differently. A narrower definition would make periodicity a quantum result, not a quantum concept. Similarly, valence-bond theory is also a result.

The inclusion of the valence bond atom theory shows the elasticity of the old quantum theory, which was described by empirical evidence and the later by successful quantum theory of Schrödinger and Heisenberg.

Concept/Answer	Energy levels	Orbitals	Valence-bond theory	The principle of Heisenberg	The principle of Paul	Period	Quantum number	The Bohr atom	Spectroscopy	N.L.P	N.L.W
1	X	X	X								
2				X	X				X	X	
3		X	X		X	X					
4		X	X		X	X	X				
5	X	X	X				X	X	X		
6		X	X				X	X	X	X	X

Table 2. Quantum concepts

Discussions

By reviewing the data above, we are led to draw some preliminary conclusions. Given the small model, and the lack of deepening of the answers to the questionnaire, we are cautious about the validity of the conclusions we can draw. However, at this point it would be wrong to download the data without interpretation.

In prioritizing what the students should learn in a general chemistry course, selecting the themes of quantum theory showed that the perception of building the atomic structure was much better than in the classical case study of the atom. Quantum theory has its birth in the problem of statistical radiation mechanics. This is no coincidence as classic statistics mechanics quickly break down in most applications. Muller and Wiesner (2002) use the statistical ensemble interpretation in an introductory course because of its conceptual clarity.

Conclusions

This study showed that:

❖ Exist an open bias that quantum theory is actually only for students who will continue studying organic chemistry or in-depth chemistry studies.

❖ It has been seen that students require a unifying model, even if they are willing to use a quantum model for this purpose since there are thoughts that mathematics associated with quantum theory is beyond their level.

❖ It has been seen that the effective use of quantum mechanics minimizes the gap that existed in the understanding of building the atomic structure and mechanism of atomic actions.

❖ The study contributes to the teaching of chemistry by providing a tool for learning, evaluating, and understanding the meaning of chemistry through quantum visual and textual modes.

❖ By adopting these general analysis, we have remained with a view of the teaching practice regarding quantum concepts that is incoherent.

❖ From the discussions addressed in this study, it was noted:

1. That quantum concepts are an added value of teaching:
2. They deserve more space in the chemistry curriculum.
3. They are essential to later chemistry courses.

Recommendations

This study aimed at handling quantum mechanics models in the teaching of chemistry. Of course, we do not think that this job has

exhausted everything, as there are still elements where it is necessary to carry out profound and specific studies. Quantum concepts are difficult for teachers to broadcast and for learners to teach.

In introducing our development work, we have found that many students and teachers admit that using quantum mechanics in chemistry is not what they wanted to be.

Based on the results of the study, what we suggest is the greater involvement of quantum mechanics in the text of chemistry by having a more detailed treatment.

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PROCEEDINGS OF THE SECOND INTERNATIONAL CONFERENCE "RESEARCH APPLICATION AND EDUCATIONAL METHODS"

SEPTEMBER 2021

Organized by the Faculty of Natural and Human Sciences, "Fan S. Noli" Universitety Korçë, Albania

in cooperation with:

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EDUCATION AND PSYCHOLOGY

(EDUKIM DHE PSIKOLOGJI)

METHODS AND STRATEGIES USED BY TEACHERS, PEDAGOGUES DURING ONLINE LEARNING

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Abstract
The purpose of this study is to provide and analyze the perceptions of pupils, teachers, students and educators on the quality of teaching methods during online learning in the period of epidemic disease COVID-19. Sampling was taken from public and non-public institutions through questionnaires as well as semi-structured interviews with a group of teachers, pedagogues and parents. Online learning can be mostly described as mobile learning. Various significant results regarding the use of methods used for online learning were obtained during the pandemic period and yielded important findings. The first and most important finding is that teachers have difficulty accessing the internet and lack of infrastructure, classroom management and human resources. The qualification offered is very empirical and far from perfecting teaching methodologies. Digital competence is endangered by the lack of school infrastructure in support of it as well as by the digital book. The lack of a Code of Ethics for the behavioral component during online learning (not reflected even after about 1 and a half school years) is another challenge of this lesson. The non-public sector is estimated to have invested more in the direction of digital competence and teaching in it has better qualities.

The paper will address its recommendations for solving the studied problems.

Keywords: *Online learning, teaching methods, creative teacher, digital ethics, mobile learning.*

Introduction

Ferris Bueller, "Life moves pretty fast. If you don't stop and look around once in a while, you could miss it.".

This is a big true also for our professional life, as a teacher, headteacher, professor of university.

Why mismanage our time and live in educational space in endless frustration when we could make better decisions on a day-to-day basis? Many life truths on education online now exist, and here is one of them: there will never be enough time for everything we need to do if we don't reconnect our strategies and methods of teaching in online learning.

On the official website of UNICEF, in the analysis that the organization makes of the online learning process in Albania the technology that enables online remote learning is not available to all, with children in conflict zones and rural areas and those from poorer households disproportionally less likely to have access, thus putting them on unequal footing (UNESCO, 2020b; UNICEF, 2020). While 53 per cent of households globally are connected to the Internet, the share of students with no Internet access at home varies from less than 15 per cent in Western Europe and North America to as high as 80 per cent in sub-Saharan Africa (Giannini, 2020; ITU, 2020)[1]. Therefore, providing subsidized or free access to the Internet is one important method of facilitating online learning. At least two-thirds of high- and upper-middle-income countries surveyed implemented this measure, though this was less common in low- and lower-middle- income countries. Providing devices at lower cost to be used for educational purposes was another measure applied, with higher- income countries more likely to implement it.[2]

"The quality of its realization (i.e. the digital learning) varies and depends first of all on the ability that the different education systems in

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[1] Giannini, 2020; ITU,2020.
[2] UNESCO, 2020b; UNICEF, 2020

the world have invested or are investing (financially in years) for it; from the extent to which these institutions possessed digital competence as part of the national curriculum standards; from the quality of the system of "production" of teachers or pedagogues from the universities of teaching and wider in contrast to it, including the system of training qualification of teachers in service, as well as from the standards of the institutions' infrastructures in relation to the quality of the digital clock (infrastructure digital). Referring to these four standards in the service of the online educational institution, *Albania, mainly the public education system, is in a challenge with digital illiteracy*. The situation changes and is observed different from this in quite a few educational institutions in the non-public sector, in the private sector, both in pre-university and university."[3]

Mobile Learning Statistics

60% of EdApp activity happens on a mobile device even though it's accessible on all devices.[4] The average completion rate of an m-learning course is 82 percent[5].Mobile learning remains the fastest growing market in the sector, with an average growth rate of 20 percent year-on-year. In 2020, mobile learning was worth $22.4 billion. By 2027, mobile learning is predicted to reach $80.1 billion worldwide.[6] Mobile learning will become the microlearning mode of choice by 2025[7]. Eighty percent of the workforce is composed of deskless workers, but most aren't receiving mobile learning.[8] Almost 90 percent of Millennials – the largest demographic in the workforce –have their smartphones with them 24/7.Twenty-five percent of L&D professionals said that their organizations already offer mobile learning, with 6[i]1 percent saying their organization plans to implement mobile learning in the next two years[9].

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[8]Source: Emergence.
[9] Source: Rapid Learning Institute

Nearly 60 percent of people prefer the vertical orientation to consume training content on their mobile devices, compared to 40 percent of people who prefer the horizontal orientation[10].

Seventy percent of workers report improved motivation to learn when they were able to use their mobile devices to navigate the courses successfully.[11]

Mobile learners' complete courses an average of 45 percent faster than those who took the modules on their computers, with little disparity between testing outcomes.

On the official website of the OECD[12], in the analysis that the organization makes of the online learning process in Albania. The transition from school to home schooling during the first two weeks has been well received by students and parents. About 86.4% of students say they agree and strongly agree with it take lessons throughonline communication and 90.2% of parents agree and strongly agree that they are part of online communication groups with teachers. Online learning in terms of home, despite the overload of parents, has further strengthened the student-parent partnership- teachers by givingparents more opportunities to participate in the learning process their children. Teaching online at home, although it cannot replace classroom teaching, has create opportunities for students to work and create independently at home by use alternative digital sources. Today students grow with technology and this resource is easily usable for them. 77.4% of parents claim that their children are developing digital competence by applying online learning. During this period most students, not only have done repetition and reinforcement of concepts learned, but also learned new concepts (84.7% of teachers and 81.5% of students affirm this), which shows that the great commitment of teachers, parents and students has managed to somewhat replace the teaching that takes place in schools. About 43.6% of parents state that this type of learning has the same quality as the learning process in the classroom, while 32.2%partially agree and 14.4% disagree. On the other hand, teachers' perception of the effectiveness of online learning turns out to be approximately consistent with the perception of parents, as 37.8% of teachers say that online learning is of the same quality as

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[10]Source: eLearning Infographics.
[11]Source: World Journal of Education.
[12]OECD report on online learning.

teaching in school, while 36% of teachers partially agree with this statement.

On average across OECD countries in 2018, there was almost one computer available at school for educational purposes for every 15-year-old student. Yet in many countries school principals reported that the computers were not powerful enough in terms of computing capacity, affecting one in three students globally.

"This crisis has exposed the many inadequacies and inequities in education systems across the world," said Andreas Schleicher, OECD Director for Education and Skills. "Disadvantaged young people have been particularly affected and every country should do more to ensure that all schools have the resources they need so that every student has an equal opportunity to learn and succeed."

Differences between advantaged and disadvantaged schools were significant. In Brazil 68% of students in advantaged schools had access to sufficiently powerful digital devices, according to principals, compared to just 10% of students in disadvantaged schools. In Spain, there was a 40 percentage-point difference (70% vs. 30%) in the availability of sufficiently powerful digital devices between advantaged and disadvantaged schools.

Teachers' capacity to use technology varies widely. On average across OECD countries, 65% of 15-year-olds were enrolled in schools whose principal reported that teachers have the necessary technical and pedagogical skills to integrate digital devices in instruction. The proportion varied considerably between socio-economically advantaged and disadvantaged schools. In Sweden, for example, 89% of students in advantaged schools attended such a school, but only 54% of students in disadvantaged schools did.

On average across OECD countries, about 60% of 15-year-old students were enrolled in schools whose principal reported that teachers have sufficient time to prepare lessons integrating digital devices, ranging from close to 90% of students in the four Chinese provinces/municipalities that participated in PISA 2018 to little more than 10% of students in Japan.

For some students, even the basics for learning are not available at home. On average across OECD countries, 9% of 15-year-old students do not have a quiet place to study in their home. Even in PISA top-performer Korea, one in five students from the 25% most

disadvantaged schools reported they do not have a place to study at home, compared to one in 10 students in advantaged schools.

The report also compares other key aspects of school policies and equity. Overall, the PISA 2018 results reveal considerable disparities between advantaged and disadvantaged schools related to shortages of education staff and material resources, including digital resources. PISA shows that, already prior to the pandemic, many schools faced shortages in resources. On average across OECD countries, 27% of students were enrolled in schools whose principal said that learning is hindered by a lack of teaching staff, and shortages of staff tended to be reported far more often by principals of disadvantaged schools (in 42 education systems) and by principals of public schools (in another 42 education systems). In 44 education systems, students attending schools whose principal reported greater shortages of teaching and support staff scored lower in reading.

While in the official website of Ministry of Education and Sports[13] the report says that the transition from school to home schooling during the first two weeks has been well received by students and parents. About 86.4% of students say they agree and strongly agree with it take lessons through online communication and 90.2% of parents agree and strongly agree that they are part of online communication groups with teachers. Online learning in terms of home, despite the overload of parents, has further strengthened the student-parent partnership- teachers by giving parents more opportunities to participate in the learning process their children. Teaching online at home, although it cannot replace classroom teaching, has create opportunities for students to work and create independently at home by use alternative digital sources. Today students grow with technology and this resource is easily usable for them. 77.4% of parents claim that their children are developing digital competence by applying online learning. During this period most students, not only have done repetition and reinforcement of concepts learned, but also learned new concepts (84.7% of teachers and 81.5% of students affirm this), which shows that the great commitment of teachers, parents and students has managed to somewhat replace the teaching that takes place in schools. About 43.6% of parents state that this type of learning has the same quality as the learning process in the

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[13]https://www.ascap.edu.al/wp-content/uploads/2020/03/Sondazhi-i-m%C3%ABsimit-online.pdf

classroom, while 32.2%partially agree and 14.4% disagree. On the other hand, teachers' perception of the effectiveness of online learning turns out to be approximately consistent with the perception of parents, as 37.8% of teachers say that online learning is of the same quality as teaching in school, while 36% of teachers partially agree with this statement.

Methodology
The study has used qualitative and quantitative methods. The study has alternating results and finding from the first study of one of the authors. The study conducted 20 semi-structured interviews in public and non-public institutions, at all levels of education in the country and for all suburbanized categories and as involved as a teaching community.
Work has been done on international documents and reports, research works, and surveys have been made by MASR, the Albanian Ombudsman are part of our qualitative research.
 The casting question online was in itself a mate that expressed its own digital competence from this community. The multifaceted form of communication used alternated 122 completed questionnaires have been returned to the form of mail (where 15 are foreign teachers in the non-public institution in Tirana, 2 foreign didactic leaders, 73 are students / pupils and 22 teachers) with 100 teachers, Using Google form, questionnaires were circulated to participants and participants were told that all opinions offered by them were kept confidential. The data was routinely gathered and reported and then analyzed using version 20 of the Statistical Kit for Social Science (SPSS). Correlations and factor analysis was used in analysis of the data. It is very common to use main component analysis as a preliminary extraction methodology, according to Tabachnick and Fidell (2001) 151 students/pupils and 140 parents, primary data from this study was gathered through google form via a questionnaire. (In total 306 teachers and lectures, 140 parents,224 pupils/students).
Using Google forms, questionnaires were circulated to participants and participants were told that all opinions offered by them were kept confidential. The data was routinely gathered and reported and then analyzed using version 20 of the Statistical Kit for Social Science (SPSS). Correlations and factor analysis was used in analysis of the data. It is very common to use main component analysis as a

preliminary extraction methodology, according to Tabachnick and Fidell (2001).

Risks during the study

    1.   There is still a "seal" in educational institutions for providing information or interviews (personal or group). They advocate for obtaining permission from ZVA holders to be involved.

    2.   The study was conducted in the last period of the year (July, the last days of August), ie after 1 year of fatigue during the pandemic.

    3.   Public school leaders still lack a culture of concentration and concrete addressing for their institution towards interviews or questionnaires.

    4.   In the questionnaires posted on google it was seen that about 15% on the number of addressees have simply seen it but do not complete it.

    5.   5. 3% of the questionnaires from teachers did not complete exactly the rubric of methods and strategies.

Research thesis and supporting sub-theses

Thesis: The teaching community in Albania is in urgent need of their qualification / training on online education strategies and methods in order to ensure the quality of education.

Sth 1: The teaching community has conceptual ambiguities, inaccuracies in the orientation towards strategies and teaching methods for more quality.

Sth2: The existing qualification system of the teaching community in public educational institutions has not been effective for the knowledge and skills needed by the online learning system

Sth 3: Leadership in teaching should lead to training qualification for strategies and methods for the quality of online learning in a collaborative and transparent manner.

Was the school and university leadership ready to lead the online education process?

What we noticed was that there was a need for a definition of traditional learning and virtual learning, the answer is pretty simple, where a

teacher teaches students in a room that is called as a traditional classroom[14] while a virtual classroom is not so different than the traditional classroom; in a virtual class, there is a teacher who is teaching but not in the class but in front of a camera of a computer somewhere, and the students participate in his class sitting in their room in front of the computer. In the virtual classrooms there can be an interactive session like a traditional classroom, students and teachers can interact. Virtual Classroom can be defined as "A collaborative web conferencing tool with an online white board, breakout rooms, and screen sharing capabilities, for teachers and tutors who want to conduct highly interactive live online teaching sessions."[15]

The human resources that serve in the Albanian education system, pre-university and university, in the 21st century, should be confident with Technology Pedagogy. In the emergency, in the absence of the ability to deal with it, in parallel with the situation, it should be invested in training on it, which would directly affect the quality of education for children but also for parents and the public. these emergency decisions would bring the education system in Albania even more qualitatively to the standards of Digital Ethics by minimizing phenomena such as digital bullying, both for children and for teachers.

"This pedagogy itself (Technology Pedagogy) is expressed as the act of teaching online. In this context, it requires from the educator the mastery of actions, judgments and other teaching strategies that evaluate different theories of learning, understanding of pupils and students, including their needs without neglecting their socio-economic backgrounds as well as their ambitions,

 Within this training of educators for PoT (pedagogy of technology), a very high-quality human resource for the quality of online education are the parents themselves, whose involvement and mutual assistance will enable a higher quality of the educational process. The study conducted at the end of September of this as a measure of the perception of students, teachers, parents, school leaders of online learning March-June 2020 again confirms the gap between public and non-public schools in the active participation of parents during the first experience of online education in institutions school. Thus, 3 out of 4

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[14]https://www.vedamo.com/virtual-classroom/
[15]Alhat, Swapnil. "Virtual Classroom: A Future of Education Post-COVID-19." Shanlax International Journal of Education, vol. 8, no. 4, 2020, pp. 101-104.

students of non-public schools declare the support and participation of their parents[16] during the process, while in public schools 1 out of 4 students affirms it. In order to change these reports, it is first necessary to enrich the School Regulations with ethical standards up to where and for what parents can be co-contributors in the online educational process. In the framework of PeT today, the world has re-dimensioned the concept of the learning space. We, the education workers, have already "owned" part of the family space. To maintain this mastery, mutual recognition of role and contribution is required. Education has the chance to emit and educate publicly the habits of learning critical thinking, skills for successful communication, for civic ethical education as well as for the spirit of the digital Albanian citizen."[17]
The role of communication in online learning took many forms and was dominate in every data-collection method. Although students took online courses because they wanted independence and self-regulation, they also stated a desire for concise directions on everything from assignments and assessments to when and how to access course information. The expectations for communication went beyond just a need for direction. All of the participants expressed a view that faculty was "missing" from the educational conversation. How instructors communicate online was perceived to a limitation of online learning. When communication was perceived lacking, participants lower their approach learning electing for more strategic or surface learning.[18]

Findings
In the questionnaire developed in a public school and a private school of the IB system we observed the assessments and behavior of some actors in the school, such as. school principal teachers' parents and students.

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[16] Keta, M, Agolli.I. "Sustainable school's community, cyberbullying phenomenon and the perspective of teachers in Albania "4th UNICART International Multidisciplinary Conference June, 15 - 18 , 2021, Malta.
[17]Keta, M. "Scenarios for online education in government documents and Technology Pedagogy, (PeT), in the direction unknown". "Dita" newspaper. October 27,2020. Tirana
[18]Armstrong, David A. "Students' Perceptions of Online Learning and Instructional Tools: A Qualitative Study of Undergraduate Students' Use of Online Tools." Turkish Online Journal of Educational Technology, vol. 10, no. 3, 2011, pp. 222-226.

In the constructed questionnaire, the teaching strategies and methods were explained to students, parents, and they were asked to circle 3 of them that they rated as the most effective. While the teachers and pedagogues were asked to complete it themselves as they are a professional community that means not only recognition but also rational judgment as to which of them was the most effective to be used in online learning conditions.

Teachers and pedagogues have a lack of understanding about the strategies and methods of the middle school. This is a shocking fact for the system considering the consequences it brings to the quality of education. Thus, it is observed that "Zoom or Microsoft teams" are cleared by some of them as a middle school strategy. (included and the school leaders)

Only 1 in 3 pupils or students and 1 in 4 parents who have followed the online lesson evaluate as a strategy of our teachers the increase in the number of participants and their activation during the online lesson. Only 1 in 5 parents estimate that teachers applied teaching strategies in accordance with the problems that pupils or students had with internet coverage, the quality of the device or even the touch of covid. Only 16% of parents estimated that teachers assisted students in improving their digital competence.

1 in 3 pupils or students claim that the teacher respected the evaluation process at the end of the lesson.

1 in 2 parents asked says that the Albanian school follows the classical method where only the teacher speaks.

Only 1 in 5 pupils or students claim that the middle school alternates the classical method with group work in online learning conditions.

Only 15% of the students asked to affirm that different E-books and videos were used during the lessons. This percentage goes up to 90% for the students asked from non-public schools but with a foreign license.

In the evaluations on the importance or the impact that online learning has on the quality of education by the respondents of the 3 categories, a trend of its "failure" is observed.

In none of the respondents, teachers, lecturers, students, students or parents, the role of the head of the institution as a mentor, trainer,

assistant for overcoming the difficulties of online learning is not affirmed. For more see the table below:

Tab 1.

Questions	Assessment by Parents	Assessment by Students	Assessment by Teachers
The 3 strategies used most by me during online learning have been: (complete)	26.8% has used many forms of communication attracting attention to increase participation and activation in the lesson. 21% was flexible, used different methods and techniques depending on the problems with the wave network, the devices we used, electricity, etc. 16% assisted at all times in mastering digital competence in many ways and forms	37.3% has used many forms of communication attracting attention to increase participation and activation in the lesson. 32.3% at the end of the hour he regularly evaluated and left assignments 29% constantly presented and recalled what was expected of us as individuals and as a group	Zoom Microsoft teams Student-centered teaching
The 3 most used methods by me during online learning have been: (complete)	49.1% has used classical teaching 40.9% has used classical teaching alternating even group discussions 28% has used power point presentations	21.1% has used classical teaching alternating even group discussions 17% has used power point presentations 15% has used e-book	Zoom Video, discussion, task evaluation Discussion, guided reading, question-answer

Describe with one word/ sentence online learning.	• Failure • Lame • It has its advantages but not in all directions. • It needs to be improved • Piece by piece • not effective enough • Partly functional	Online learning was partly productive, but a necessary choice during the pandemic. The most problematic was the management of classes that have not always been interactive as well as the acquisition of competencies in subjects that require effective laboratories. It's good but it needs more work The teaching was somewhat effective. Problem Minimally effective Good enough Quite satisfactory in the absence of the auditor	Loser Needed for the pandemic emergency situation It happened, we tried, we are learning but I know!!! Good Still an experiment from the courage of teachers and educators Difficult to achieve the goal it has Active and quality participation

Discussion

There are some questions that arise after the data of this study and that need to be answered in depth through the following studies. We could present such.

Is the Albanian educational system prepared to have digitization as part of its quality standards? Do Albanian middle schoolers possess digital competence and PoT?

How far has this system of teacher qualification reached the ability with digital competence?

How does she deal with the interactive class and with a student who needs to have soft skills?

How much does the internal system recognize, value and use as models to follow the experiences that come from educational institutions with international patents?

Are school leaders' fools who managed the challenges of online learning for students, teachers and parents?

How many studies by Albanian researchers were carried out on this topic?

What is the responsibility of each actor and factor in education against digital illiteracy?

Is this situation being discussed and analyzed and what measures will be implemented to overcome the damage done.

Online learning should be accepted by everyone as part of the quality standards for the teacher and the pedagogue, the student and the student as well as for the Albanian parental community, this standard that will make the new generations and the system itself competitive. Teachers need to observe the change in their roles, i.e., from merely being a conduit of information to the planner of the instructional method, one of the major problems facing teachers in rural areas.

Students are often said to be spoon-fed in conventional classroom schooling, but online courses need a learner-centered atmosphere that allows students to be self-motivated. Teachers' ought to invest every effort into improving student mindsets.

Schools or government must periodically carry-on training and learning projects for teachers as well as students to accomplish this aim. The study also revealed that e-learning has a more important role to play in the future, but it will not replace conventional face-to face education in the classroom. It is very tricky to make a full transition to

online learning. The advantages resulting from e-learning, however, should not be overlooked.

As such, it is important to consider and take corrective steps to resolve the barriers that fall in the way of embracing online learning.

Conclusion

The data obtained from the conducted study express a critical perception by students, teachers, pedagogues, parents on the quality of online learning. This perception affects the malformation and the attitude of almost denying the value that this type of education receives as an integral part of the training and skills of young people with digital competence, but it is also harmful to the system itself. This kind of mental attitude is in contradiction with the importance that the post-Covid human society has given to the mastery of digital competence and the conception of the labor market or work even from home conditions. Albania is exposed to digital illiteracy until these past developments through past experiences during the covid quarantine but not only. These critical perceptions are related to the clear lack of understanding of the importance and place of Technology Pedagogy as part of the pedagogy in successful teaching and learning, this, in the strategic documents of the development of education in Albania. The consequences for the non-inclusion of PoT as part of the pedagogical skills of our teachers and pedagogues are also encountered in the system of recruitment of human resources in education and behind it also in the way in which the qualification training scheme or the career procedure for employees in system. The strategic documents of education in the country, at all levels, lack legal codification but also through institutional action matrices for Digital Ethics as part of the Code of Ethics in education for employees in the system but also for all partners and collaborators with them. There is a lack of qualitativeand follow up studies on these topics by local research agencies and researchers. Meanwhile, the Ministry of Education, educational institutions has a lack o concepts for statistics and essential data for the quality of the digital educational institution in the country. The school (with the parent community) and the university lack the conception and commitment as concrete contributors to digital public education as communication with the public through them has its own qualitative impact on this type of skill necessary for the century we live

in. Albania has not approached the standards that UNESCO, OECD and other international organizations have produced as political materials but also as concepts for the operation of Digital Education for all member and non-member states.

Teachers need serious preparation for PoTto use effectively online tools and platforms. They are not all ready for the new situation, which further opens the issues with our overall education. We are all aware that if we want to improve the quality of education, we need to better use digital technologies, but we also need to provide appropriate support and training to teachers to support the quality of instruction.

When asked about their experience with learning online teachers say: "Most of the students are attending the classes and fulfil their homework but now we can't tell whether they completed the tasks independently or if it was a group effort. As teachers, we found ourselves unprepared. It is really challenging since we never had any training on distance learning."

- Teachers' community has conceptual ambiguities, inaccuracies in the orientation towards strategies and teaching methods for more quality.
- The existing qualification system of the teaching community in public educational institutions has not been effective for the knowledge and skills needed by the online learning system
- School Leaders in public schools are ambiguous, inaccuratefor strategies and methods for the quality of online learning in a collaborative and transparent manner, in school.

Recommendations

Our recommendations are derived from the points that researchers consider critical in the data collected from the study. They are addresses to some of the institutions that focus on quality assurance in education as well as academic ones that produce teachers or offer certifications related to school leadership. Thus in the field of policymaking, the study advises re-evaluating the qualification system in the country and holding it accountable by specialized state qualification agencies. This agency should have its own structures in each basic local unit, ie strengthening the ZVA with competencies on qualification.

The policy maker to review the curriculum of the School of Directors as well as the training staff.

Policy-making to reflect on the legislative side the legal regulation of digital infrastructure and its use for the purpose of online learning as well as to urgently compile digital ethics as part of the Code of Ethics in educational institutions. To review the mechanism of transparency for responsibilities and freedoms between the parent community and the teaching / learning community, where all together are conceived as quality assurance factors. The local government should clarify its responsibilities for the obligations it has shared with the provision of digital infrastructure in institutions and communities.

The study recommends strengthening case-by-case solutions in the network of educational institutions through medium-term institutional strategies where online learning is conceived more integrated, as part of everyday life, in the school and academic curriculum. 2. Strengthening the detailed cooperation with the object of quality of online learning to be enabled by the assistance of successful non-public institutions, seeing the latter as qualification resource centers from the competencies that should be possessed by the school leadership, the internal education system up to infrastructural standards and forms of transparency communication with parents. (A willingness of non-public institutions involved in interviews and evaluations to assist in the qualification of public institutions was noted, Kings Tirana). Creating sustainable networks of such qualifications should be part of the institutional development of every ZVA.

The study urgently evaluates the revision of the university curriculum in the faculties that prepare teachers in relation to digital competence and Pedagogy for the preparation of new teachers but also for those in the system in their education. Universities with teaching faculties should undertake studies that really give the state of teacher training for the mastery of competence to know, build and develop teaching strategies and methods that strengthen the quality of online learning in the Albanian education system. Universities need to build joint projects of European partner universities and beyond with a focus on resolving this critical situation in digital skills and online learning in education systems.

to policymakers' recommendations: MASR should cooperate with the Ministry of Culture and the National Library should solve the School Library with the digital book (for pupils, students, teachers and parents)

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SOME REFLECTION ON GREEK THOUGHT ON EDUCATION

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Abstract
Societies that keep on aiming for better education do further not just achieving better qualification for employability, preparing the professional, the expert, the producer, the technician orconcerning mainly with the strictly cognitive aspects of knowledge but also shaping individual's holistic personality,educating values, attitudes and feelings.

We have to reflection the Greek thought on education, proving to be a precious tool, still valid and useful to answer our questions today on knowledge and education.The paper argues that the purpose of education (*paideia*) in ancient Greece was the development and continuous exercise of the power of human mind, in its theoretical and practical dimensions. *Paideia*was meant to make effective civic and public values for the good functioning of the community, as human existence was understood and realized only in the context of the community. Especially, we will focus on the role of Socratic dialogue, as an original educational and didactic method that contributed deeply to the development of Western thought and the history of Western education and pedagogy. For many centuries, even in today's society, many educators are inspired from its edifying power and its broad vitality.

The messages of classical Greek thought can help to understand that the school and the university have as their function not simply churnout graduates with credits and diplomas, but educate and shape free citizens, able to think critically and independently, creative people with a flexible mindset, with life and social skills.

Key words:education, arête, good citizen, dialectical method, critical thinking, Socratic dialogue.

"The intellectual principle of the Greeks is not individualism but 'humanism'… It meant the process of educating man into his true form, the real and genuine human nature. That is the true Greek paideia…."(Jaeger W, Paideia: The Ideals of Greek Culture)

<u>*"At its best, schooling can be about how to make a life, which is quite different from how to make a living."*</u> *(Postman N: The End of Education)*

Greek philosophy, with its outstanding moral and educational stature, always remains a source of reflection for the man of our contemporary age; the ideas of Greek philosophers have always nourished us with current messages about education.

Education in Ancient Greece was called *paideia.*It was central to the ethos of classical civilization and meant education for life, ideal of human formation, culture in the highest qualitative expression, self-formation, self-realization or, more simply, to become the best version of oneself. (Helskog, 2021). Paideia was the goal of Ancient schools of philosophy and signified a development process towards *wisdom* in general and *phronesis* (practical wisdom) in particular, understood as the awareness to do the right thing with regards to living a good life overall. Itsignified a development process,an improving and transformingone. As self-formation, *paideia* embodies the intention of offering man a process to grow as a person and to develop ethically and existentially. In this process, people develop through self-understanding and through realizing this self-understanding in practice, which is self-realization. So, education consisted not only of one's knowledge and skills, but also of one's success at attaining a virtuous and cultured reconciliation between the demands of day-to-day life and of a higher spiritual life.

Paideia became the ideal that encompassed the entire intellectual and cultural wealth of the city-state, and each citizen had a lifelong obligation to cultivate his individual portion of this heritage. (Hancock, 1987)

Socrates, educator of all time

Our culture and education today seem to be greatly influenced by egocentric conceptions of individual development and the idealization of pragmatism, bythe economically oriented interests of *homo-economicus* and economic categories. Economic forces constantly impelling scientific-technologicaland concomitant socio-political

interests steer pedagogical narratives in the direction of pursuing utilitarian outcomes and fixed-ends. (Michaelides, 2018).

But embracing utilitarianism and individualism as approaches for schooling and education means to leave the young peopledeficient in ethical and communal values. In fact, the subjection of educational purposes to economic, technical or consumerist onesis far too limited to be useful,as it abandons the role of education in the formation and shaping of young people as critical thinkers, with independent mind, and with strength and skills enough to change what is wrong. It diminishes and weakens the aim of education in providing a guide for to live virtuously and wisely, cultivating the man's sense of what is truly of value in life.

In his book "The End of Education" (1995), Neil Postman makes a comparison between the nature of education today, influenced by technology, and the classical Greek tradition for education. According to him, the computer is an example of how technology has changed education. As information passes through a computer, the computer itself doesn't change, as the hardware and operating system stay the same, and it remains only the *receptor* or *transmitter* of data. The same with how we have begun to regard students, as mere receptors and transmitters of information, that means passively receive data andthen transfer or reproduce it. Quite differently, in the classical tradition,education has been understood to change people fundamentally and it is considered by Plato "a conversion of the soul," a turning toward wisdom and truth, *forming* human beings.

The great philosophers, Socrates, Plato and Aristotle refined and advanced *philosophia* remarkably, rendering it to prominence as the most precious dimension of classical Greek education. (Michaelides, 2018)

We owe to Socrates the model of philosopher-educator and citizen. The heart of *philosophical paideia*is manifested inhis dialogue,that aims at shaping and developing the moral character. Through all his philosophy, Socrates encourages the young people to pursue and appreciate the personal *arete,* the human virtue, and Socratic dialogue impresses the reader in terms of the importance that moral perfection, in addition to technical perfection, has for both personal life and the educational effect in the community.

On the other hand, we owe to Socrates also for the method embodied in his dialogue and destined to become one of the most effective educational methods of all time, the *dialectical* one. It means intersubjective research and education, where *polis* (community) is not just a background; in fact, this freedom of research and education takes its physiognomy and its identity precisely in the polis, in the community, in dealing with other people. To Socrates, the philosopher is not an isolated personage, an individual, as his action, his thought, his research appears always in relation to other people who are there, who are real and who can respond and oppose. (Hadot, 1995)

It is known that in the Athenian society of the fifth and fourth century, the individual is considered and educated as free political entity, a responsible citizen, part of a living civic community and the education aims at making him an active participant *of bios politikos*, a *bios* that valorizes the freedom of speech and expression and encourages *dialogue*, in the name of the good of *demos*. (Michaelides, 2018). Referring to this society, we recall a comment that Hannah Arendt made to the public life of the polis, where decisions were made through the path of persuasion, word, speech and not through force and violence, where freedom was cultivated through politics, as people did not subordinate but felt themselves interacting with others, in the name of their engagements and enterprises, chosen with their own free will. (Arendt, 2000).

The research in Socratic dialogue progressesnot with the aim of mastering the truth, but of educating and freeing oneself from illusions. Questions, irony, confrontation of theses, opposition and comparison constitute the instruments of the dialogue. Its educational-didactic effectivenessis based ina "dialogic rule" (definition of the "problem", discussion of opinions, argumentation, loss of prejudice, listening to information, careful gathering of facts and experiences, etc.). Above all, the innovation of this dialectic and educational role of dialogue, as a form of philosophical research, necessarily implies and includes the transparency and freedom of individual'sconscience. The Socratic dialoguerequires a lively conscience, which can confront, in the dialectical game, the dynamic elements with which a mental potential is rich, as knowledge, but also deceptions and misconceptions, illusions and contradictions.

Because philosophizing is about holding several sides to an issue, it is important to use different perspectives and multiple "torches" when shedding light on a situation. This makes it possible for people with different feelings, attitudes and convictions towards an issue, to come together around a cause. (Helskog, 2019) If we analyze, for example, the discussion on Justice in the Republic, it reveals a clear display of the value that dialectics offers: multiple and opposing views and approaches, a growing tolerance of ideas and pluralism of voices, a reinforced belief in civic participation, allowing general opinions to be continuously evaluated for their accuracy, even when the most correct answer perhaps may not be found.

On the other hand, Socratic dialectics, embodied in Socratic dialogue, exploits and uses all the resources of life and thought when it needs to liberate and elevate the mind and it is nourished by all experiences of life.

Dialogue and active learning
A main peculiarity of the Socratic experience is the fact that it appears orally and in the form of dialogue, thus as a confrontation with oneself, with others but also with the *polis*, as there is always a small permanent audience that surrounds Socrates. While, as readers, we are involved in the Socratic experience existentially, we confront and identify ourselves with the characters of the dialogue. We compare our answers with theirs, we are intrigued by choosing to follow with seduction the questions that appears in the text. Ideally, dialogues give us the courage to ask Socratic questions to ourselves and to our friends. The courage of research is an important value of the Socratic experience.

The Socratic rule "to say what you think" explicitly becomes a barrier to the justification of beliefs and opinions based in authority, popular success, political power, even in the words of Socrates himself. By not accepting the protection of personal views by simply appealing to the authority of experts, the latter could be challenged, in order to learn more about the truth, commonly desired.

In the scheme of Socratic dialogue (or in the Platonic scheme), everyone is a student, ideally engaged in a cooperative, collaborative way to achieve the truth. Accepting the ignorance of oneself and others inspires courage, freedom, and the obligation to seek the truth. The experience of *aporia*, often present in dialogue, is a confrontation,

which contains the awareness of the complexity of the issue under consideration, but also of the fundamental importance to reach a solution. An active, intellectual movement of thought is thus encouraged.

(Though today's world of electronic communication and major technological changes is considered in favor of interactive communication, anyway,it would be fruitful for us as to view this convenience in receiving information with skepticism, and to submit it to the Socratic experience).

Dialogue and the increasing of self-motivation

In conditions when the world and our life is in a constant flow of change, it is very important to educate motivation and ability in learning. Socratic dialogue helps us to identify goals, fostering the desire to achieve them in conditions where technology, social ambitions and political pressures threaten pure human values and goals. (For example, the same Socratic or Platonic educational project has itself a *telos*, a definite purpose, because, without it, sophistic relativism would prevail).

Socrates knows that the love for knowledge, more than knowledge itself, is the most valuable and that the teacher should convey it to the students.

The appreciation of the importance and complexity of knowledge is manifested through the personal will to discover and pursue it. Socratic guiding questions serve to develop precisely this kind of evaluation and to foster the pleasure of searching, of researching, of "hunting" for the truth. Even the goal in this direction is dynamic, never static and, to achieve it, it requires constant effort at the highest intellectual levels. After all, the desire for truth remains essential to philosophical existence.

Dialogue and the cultivation of critical thinking

Socratic dialogue encourages and cultivates critical thinking. In fact, there can be embodied in the individual's mind or way of thinking structures of beliefs or convictions, as a response and self-preservation to the impact of environmental pressure. On the other hand, the motivation and dynamics of our efforts for a social, physical and spiritual security and comfort, affect the quality of critical thinking. So,

to think critically, the individual must face and overcome the pressures that come from the external environment, and internally, from within. The Socratic method educates people particularly to believe in the experience of raising questions and issues, examining and researching them, and the practice of asking about things, as well. H. Arendt used to say thatcritical thinking must not be applied only towards others'doctrines and concepts, or to prejudices and inherited traditions, but should demonstrate the application of critical standards in everyone's thought and way of thinking, as an expression and mastery of critical thinking as art, as *techne* (Arendt, 1992)

Who is afraid of questioning does not make them, and, ironically, even those who feel proud of their high degree of intellectualism, of their reason and thoughts, may not have educated optimally the lack of fearto themselves. In totalitarian societies people are punished precisely for the courage of questioning, of raising questions and of discussing certain issues. But this is not applied only to these types of societies. Even in our today's democratic societies there is a kind of conservatism, restraint (by family, school and institutions, or even government), forced to us to believe that we must be careful about our will or way of questioning. It happens even in democracy, that people have pressure to stop a search, a research or questioning, when these have to do with the competence, value or integrity of political leaders, or popular figures, or certain institutions.

On the other hand, let's say that we cannot exclude that in our critical thinking there can be also some influences or pressure, the internal ones, that are results of interaction with our subjective preferences, personal beliefs, or the effect of our previous actions, concerning sensitive issues. However, it is very important to love the way of questioning in advance, if we want to use the Socratic method, which provides people with the opportunity for positive experiences.

On the other hand, if people are placed in an environment where the practice of questioning is really friendly, respectful, helpful, then, they are endowed with the positive experience of questioning. They are even encouraged to create better ideas and beliefs. This will make them to feel good and embrace the heart of critical thinking, which is the freedom and willingness to ask, without fear of any kind, strengthening the ability to think critically.

For a democratic society, fostering critical thinking is a key for an active and critical participation in social and civic life. Without citizens capable of critical, practical thinking, democracy is an empty achievement. So, from this point of view, the dialectical method offers a way to foster and deepen democratic culture and fulfill the potential of democratic ideals.

Some conclusions

Education in our time is focused on professional skills that naturally promise practical success in the real world. But the cultivation of moral virtue and development of moral character, without confusing the ambition of temporary material and public success with true human virtue, should also be the goal ofeducation, together with perfecting professional skills. The spirit and importance of the moral formation for the personality of young people, must take much more place and becomean integral part of our school disciplines.

Socratic action, with its didactic, scientific but also its ethical aspects contributed to tracing a turning point in the thought and development of the history of Western education and pedagogy, and after many centuries, even in today's society, many educators have drawn on its edifying power and its broad vitality. As an educator and philosopher, Socrates gave rise to the long debate on what education is, on who has the right to educate and on what are the optimal educational intervention methods. He recognized the pupil as an active subject, a real and direct protagonist who builds his or her training path. He initiated the process of strongly emphasizing the individual value of the person, in the entirety of his freedom and moral responsibility, without thereby setting aside the essential role of the "educating community".Socrates believed in the constructive power of "reasoning", a modality that leads to the relevant conceptualization process, contrasting the method of imposition or cultural transmission with that of personal and authentic discovery of knowledge. His dialogue represents not only a challenge from cognitive and linguistic point of view, but also a strong emotional participation, so a change in the way of existing and behaving.

The Socratic imperative "*Know thyself*", "*take care of the soul*" because the soul is the essence of man, invites modern man to devote time to this dimension of his existence, which seems to be forgotten. We talk

little about spiritual values, while Socrates teaches us to know ourselves and believe that we can change it, that we can create new ways of thinking, of feeling, of acting, and that we can even use philosophy to create healthier lives. So the message of the Greeks to the citizen of today comes to us in time: Remember that you are not your body, but you are your soul. We recall the remark of Socrates(as Plato pointed out in his Apology),who addressed the Athenians with the words that "Virtue does not come from wealth, but. . . wealth, and every other good thing which men have. . . comes from virtue."

Another lesson from Socrates is the dialectical discussion, so imperative for a democratic society. It provides the opportunity to develop the skills of citizens, capable of constantly challenging the *status quo*, by suggesting ideas based on these challenges.

The Socratic dialogue expressesalso an important message for today, in the current political and social context of Albanian society: the need and importance of cooperation and consensus between the opposing parties, in the name of the common good. So, consensus, reason, "logos", the relationship and evaluation of the other as participant in the dialectical achievement through dialogue and speech, are the important messages from the Greek world.They take a very current and important relevance for today's civic coexistence, as they challenge the mentality of violence, intolerance, divergences in socio-political life of today's society in general, and in the individual's life in particular.

On the other hand, thecultivation of Socratic dialogue significantly implies the effective way of promoting and nourishing human freedom.As a method of philosophical research, philosophical dialogue implies in itself freedom of thought, open, free search. Socratic dialectics, embodied in Socratic dialogue, exploits and uses all the resources of life and thought, when it needs to liberate and elevate the mind; it is nourished by all spheres of life.

When Plato wrote his Socratic dialogues,his intention was to arm young people to face the real world challenges and temptations. By understanding Plato's pedagogical objectives in Socratic dialogues, we will be able to appreciate and use them in today's educational enterprise, adapting the Socratic experience to interactive educational technologies.If the core theme of Ancient philosophywas that of the art of living, about learning to live a good and just life in society, it implied the progress towards specific wisdom virtues, which,in fact, are not so

different from the *life skills* and skills needed for *democratic citizenship*. A major difference, of course, isthat the ideas of democracy and the art of living in the ancient world were developed with a few free men and boys in mind, while today it is meant to involve everyone, regardless of gender and social status.

The practice of *philosophizing*and doing philosophical dialogues with students, of investigating general aspects of the human condition like freedom, justice, responsibility, etc. seem to hold valuable potential with respect *both* to life skills and democratic citizenship. Educating and practicing philosophical dialogue means enriching good communication, interpersonal skills, self-awareness, assertiveness, creative and reflective thinking.The students startto make an effort to understand each other, showing empathy and truly understanding of the position of the other person. They exhibit openness to expressing one's point of view with respect for the rules of thedialogue, maintain a respectful tone even in the most extreme conditions, have conversations about what truly matters assume responsibility individually and collectively, have the courage to recognize differences and, even more, to recognize commonground and demonstrate the capacity to change.

On the other hand, this activity also empowers students to value diversity and equality, to promote thesocial cohesion, to build mutual respect for human dignity, to enhance and promote dialogue and non-violence in the resolution of problems and disputes.

To investigate lived life, to find orientation in what we do, who we are, where we stand and finally to develop as human beings, is the real understanding of Socrates's saying that*The unexamined life is not worth living*.

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THE PHILOSOPHY FOR CHILDREN AS A CONTEMPORARY TREND IN THE EDUCATION PRACTICE

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Abstract
The aim of this study is to present the philosophy for children not only as a contemporary trend, but also as a field of interest in the practice of children's elementary education, with the abilities and habits of reflective, creative and critical thinking in Albania.
To fulfill this aim, several objectives had to be achieved:
The presentation of worldly experience in the philosophy for children;
The importance of the philosophy for children in the improvement of the practices of children's education;
The presentation of the originators, the streams and the methods used;
The presentation of the concrete situation in our schools regarding the philosophy for children;
The presentation of viewpoints of the groups of interest;
The analysis of the current situation in our classes of elementary education;
The conclusions drawn.
The study comes as a result of research in the materials and literature about the philosophy for children.
The study has a descriptive, theoretical character, but there are also many concrete situations. For the realization of the study, classes or a part of a class, were taped and polls with a population of teachers and pupils were done and analyzed.
Cautiousness was needed to not violate the ethical principles. Only those school names are mentioned, where the observations and polls were realized. The observed classes were consented by the teachers, the children and the schools' psychologists.
The philosophy for children as a contemporary trend in the education practice

What is the philosophy for children?

> *The philosophy for children is an educational practice that seeks to develop the critical, creative, and reflective thinking in children of any age, starting from democratic discussions and the manuals in the pedagogical frame of a community of philosophy researchers. Today it is a stream between the education sciences, philosophy, and pedagogy.*

The philosophy for children was born in the USA in the Seventies, form Matthew Lipman and Margaret Sharp, both philosophy professors in Montclair State University, New Jersey. As he was teaching philosophy to his students in the University of Columbia in the Sixites, Lipman noticed that his students werre passionate about changing the world but lacked the ability to reason wisely and to excercise deep rationalization (Matthew Lipman).

He also understood that by the time the students came to college it was late to learn how to think properly, so he created the movement of the "Philosophy for children". The results of Lipamn's new program were promosing and showed that children took up philosophy zealosuly. For the first time there was proof that children could become philosophers, *in a certain manner.*

Afterwards it was embraced by education actors who considered this a moment to revive the education disciplines, while the philosophers remained dubious. The movement spread in Germany, Argentina, Australia, but the two countries which gave it great importance and will play a major role in the further development, were Canada and France. This relates to Michel Sassevilleof Laval University and Michel Tozzi of Montpellier University, two names that represent two schools of the philosophy for children. They strongly emphasised the idea of a philosophical dialogue and discussion between the children.

Can children do philosophy?

While speaking of "philosophy for children" it's understandable to face the claim that philosophical matters are too difficult for them. According to these claims the children don't own the right cognitive mechanisms to handle the methods or the subject of the philosophical investigation. It's not that the cognitive abilites of the children are underrated, but that the cognitive requisites of philosophy are overrated.

We begin with a journey in time, in philosophical thoughts and theories, and stop at the "wonder of language". Her connection to philosophy can be presented in broad terms. *There is no doubt that the first great wonder in the human evolution was, above all, language. We, of course, don't know when it was born, but in regards to writing... and the figurative abilites, we can settle a beginning…*(Gadamer, Historia e Filozofisë, 2008).The alphabet, the language as a necessary "material of clothing" is possible for our philosopher children.

We continue deep in the years when the meditation on the world order begins, a cosmogenesis that doesn't tell stroeis of gods and legends but dares to raise "provocative" hypotheses on the way that this world order was created and how it evolved. It can be said that Greek philosophy was developed as this primal, big study of the environment, until it became a cosmogenic theory. The Greek word for this field of knowledge is "historie", which doesn't man history in the sense we're used to, but rather *"cognition for knowledge", hence a curiosity that wishes to understand everything that can be seen in the world*(Gadamer, Historia e Filozofisë, 2008).Precisely here, we all agree that no one is as naturally equipped as children with mechanisms and unlimited desire to explore the world, and with possibilities to correct and prove the created experiences.

Children may often ask spontaneously philosophical questions, "strange questions". John White argues that not every question asked by children, no matter how "strange" it sounds, can be considered a philosophical question (White, 1992).Here he argues that a question is philosophical not only in its verbal sense, but even in the sense of the reason why it is asked.

At this point, convinced that this case requires a deeper research, trying to keep an appropriate balance, trying not to fall in the enthusiasm of calling every question "philosophical" and at the same time not say that asking questions is unnecessary, what we should consider is that children already have a born ability to ask questions. Undoubtedly, like the unprepared and philosophically uneducated adults, children too need to be handed the right keys that will guide them towards the philosophical education, complying with their age.

Maybe the following will sound very courageous. It isn't widely known that a majority of Newton's texts is about theology and not physics. Kant has also regarded his work with interest, calling it *the*

magnificent true solution, thanks to which the celestial and terrestrial physics, thus the entire field of galileic mechanics, tangles in one single science. Here we speak of the theory of gravity and universal pull, which we know is applied on Earth and the entire space(Gadamer, Historia e Filozofisë, 2008).Going back to the children, who better than them dares to match the credible with the incredible, the scientific with the imagination, making so that future geniuses are born.

We come to Husserli's expression of the "shape of life", conceived by him to describe experiences of everyday life, away from theories, only relying on describable data. *I don't need big banknotes: crumbs, my dears, only crumbs!*(Gadamer, Historia e Filozofisë, 2008).It is possible that the children describe us their life experiences. It is possible that they bring an original, daring viewpoint of these crumbs of experiences, opposed to other viewpoints from other peers, and not only.

We can move on to a concrete situation: Fourth grade pupils in an elementary school of the town were asked if tey had ever felt like philosophers in class, shcool, or other environments. This was the answer of one of them:

> *"When I was learning the multiplication table in second grade, I realized that when multiplied by 9, the last digit was reduced by 1 (one) and the first digit increased by one (1). E.g. 9 x 2= 18; 9 x 3 = 27, and so on: 9 x 9 = 81.*
>
> *When I told mom, she said, 'Mom's little philosopher!'".*

Without wanting to draw comparisons to Gaus and the way he discovered the rule that now has his name, we go back to Tales. Regarding a geometrical truth conceived by him, it was said that it was a platitude because *"...the Egyptians have know for ages!"*(Gadamer, Historia e Filozofisë, 2008).The value remains that Tales truly didn't discover the principle, but he was the first to have searched for a proof to found it. In our case, the rule of the mulitplication by 9 wasn't discovered by the 10 year-old pupil. It was known long, long ago. The important thing is that the 10 year-old was able to find proof of the existence of this rule.

Trying to show that there is nothing serious that prevents chidlren from elarning philosophy, it can be said that the cognitive

requisites of philosophy are neither bigger nor more difficult than other forms of research for teh subjects that are common in school curriculums. Undubtedly it is difficult to be done well, but it is easy to start. The reasons and core procedures of this practice can be realized.

Should children do philosophy?

I would like to talk about the results of the State Matura exams. Several problems can be implied here, but among them it is right to assess the case we're looking at. Maybe the students' training isn't right. At this point we're not discussing the serious commitment to the field of study from students and teachers alike. What should be assessed properly is the late time in which the training in this field begins, or the inclusion of this field sometimes in the core curriculum and sometimes in the optional curriculum, without claiming the spot it deserves to have.

In the results of the 2018 State Matura, only one student out of 1450 that took exams of choice, had picked philosophy. In the population of the study the other 42 students picked sociology. The only student who picked philosophy earned a 6.8 evaluation in this exam opposite to his 8.3 evaluation in the foreign language exam.

There are many ideas and arguments from philosophers and researchers that it is up to the children to elevate society to a different degree of thought and this can be achieved by offering them ways and means of raising questions and constructing dialogues since the early years.

There are many ideas on the things that children should learn. Writer and philosopher Steve Neumann defends his idea of the things that we should teach the children, especially in our times where we are focused on bringing children closer to technology, away from the very essential, direct communication. However, this is not the only problem that schools should solve. If we discuss the idea of children in schools becoming philosophers, we will probably encounter the opposition of parents, teachers, but also philosophers themselves. They will put a question mark on whether children can do philosophy. Maybe, according to them, children can be taught basic, superficial terms of philosophy and later will probably conclude that it is unnecessary.

The truth is that nothing can be more necessary for the future well-being of our children and our society than teaching them how to become philosophers. "It is easier to create strong children than to

repair a broken man", - said Frederick Douglass and in this sense, it is essential that our children become philosophers.

We're not speaking of teaching children the philosophy that is taught in high school. For younger children it would be too much to delve into the theories of Plato or Kant. The philosophy we're speaking of is the one that helps children become better citizens, transforming the class into what philosopher John Dewey called "the embryonic society".

To understand why this is important we simply have to look at the current situation of our society, where delicate matters such as racism, economic inequality, arms, internal and external terrorism or economic change, are discussed very harshly. There should be hard work put into the understanding that society is a necessary compromise, and that critical thinking and effective communication are necessary for the success of society.

Going back to Lipman, passion alone is not enough to change the world, for there is need of the ability to reason wisely and use rationality in order for this change to be achieved. Therefore, one has to grow with the early thought, request and attempt to learn how to think properly and efficiently.

After studies and research, Lipman writes: *"Those who involve themselves in philosophical dialogues over philosophical matters, though they don't perform with the accuracy of specialists, are doing philosophy. Even though they are very, very young, for as long as their performance conforms to the rules and standard practices of the discipline, they are doing philosophy".*

Other philosophers after Lipman have also discussed the need of philosophy teaching for children, but the dialogue has always been the priority. It is the teacher's job to instruct and inform the pupils, helping them focus and reach the ability of a good rationalization, ensuring equality and mutual respect.Through the teaching of philosophy to children, it is possible to achieve a more promising and stable approach to life in a pluralist society. If we don't manage to turn the elementary schools children into Socrates, they may still become experets in achieving the means of life, but they won't be able to create a civil society.

In the future children will need other abilities. In a world where the technological expertise is growing exponentially, the ability to do more, will be a key factor in many fields. There will be need for

prepared people who know how to ask and answer questions that aren't ready-made. So, as a society, we have to be philosophically involved. Teaching philosophy is one of the strongest weapons that a society can have to prepare responsible, free, interconnected children with an expansive knowledge in an unclear world. Teaching philosophy in the classroom means acquainting the children with humanity and democratic culture. An early-fed philosophy can build the necessary immunity against recklessness, prejudice and wrong beliefs.

Many studies conducted in the last years prove that the early years have a major influence in shaping up the personality of the child. There are even bold statements that until the age of 5, a child has learned everything they will need to learn for the rest of their life and complete their formation. Aiming for the successful development of children, we should push for quality education.

The philosophy for children has raised important arguments about including the practice of philosophy in preschool children. According to Lipman, learning philosophy in elementary school raises the ability to write and read better. Its aim is to go beyond the given information, beyond the text meaning, in order to move on to the conceptual and analytical level.

Researchers who study children's problems areconvinced that it's important to learn the art of rationality and reflection in elementary school. Such is philosophy: a way to set free the creativity and reflection of the children. *The philosophy for children includes a new educational paradigm that can encourage and feed the beginning of a conceptual experience in children to teach them how to think in a practice where there are guided towards the discovery of truth through processing different reasonings.*

The new generation of philosophers is growing up. Droit states that Plato and Aristoteles said that one becomes a philosopher when one is amazed and asks about things, and this is what children are doing today and always.

According to experts, it's very important to benefit from this phase to build the ways of thinking for the future. It's not bad to teach the children elements of philosophy. It makes them use their brain in more critical ways. Children should understand in their own way that doing philosophy is entangled with the history of ideas, with the evolution of

critique and reasoning, and even with the major scientific discoveries. This is the only way to raise the critical sense of the pupils.(Poggi).

Aside from the development of cognitive abilities, philosophy for children has an indiscutable connection to the education sciences. One reason why they are connected is because the former greatly influences the classification of knowledge and their redistribution; because the education sciences are in constant structuration and change in order to define the curricular frame, the quantity of knowledge that pupils should receive. Another reason for this connection is that the main task of schools today isn't the mere introduction of an idea, but the integration of this idea in the knowledge system. Eric Hamraoui[1]says that our ideas are loose parts that sail in our brain and they can fly. What could play a significant role in fixating and maintaining the knowledge, is the practicing of philosophy. Learing how to analyze, synthesize, differentiate and build cause and effect relations, children will be able to successfully classify the knowledge they receive in different fields.

Today schools are faced with objective challenges. There is a variety of information and the sources are many: media, internet, books. All this information challenges the information distributed in schools. The absolute holder of knowledge is no longer the teacher. The true challenge of education isn't how and where to ensure the spread of information and knowledge, but how to ensure their structuring, how to ensure the intellectual schemes for achieving the arrangement of knowledge.

> *Including philosophy earlier in the classroom will be the best mean to confront the conventional wisdom of our era.*

I would like to bring to attention another argument regarding the necessity of philosophically training children. It is very eay for us to strike with bottles, stones, slaps, even to take another life, just because we weren't raised with the idea that someone else has the right to think differently from us. Dialogue is key, because only then our reasoning and our conclusions are challenged and only then we become good thinkers. In this process of becoming better thinkers through

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intellectual dialogue, our children will become better citizens of a world that belongs to everyone.

The philosophy for children in the viewpoint of elementary school children.

We organized a questionnaire in two schools: "Mësonjëtorja e parë shqipe" (a third grade and a fourth grade) and "Sevasti Qiriazi" (a fourth grade and a fifth grade). Both are shcools with a similar community of pupils, and teachers of similar experiences. Children of the third, fourth and fifth grades took part in the questionnaire. Since the answers were written down, the delay in time exempted children of the second grade to undergo the questioning.

Their answers are very important as they are the main factors, the object and subject of the philosophy for children. They offer their thought to transform in in critical and creative levels, they will try to build their own independence in reasoning. They are the ones who need to be guided on how to find the right means and ways to live the advanced present intensively and dignifyingly while keeping their eyes to the certain future.

Two questions were asked:

- What is philosophy for you?
- When have you felt like a philosopher?

Reading the answers, it becomes clear that the children wrote them after giving them some thought. A philosopher, for them, is a person who is smart and wise in all fields and doesn't make mistakes. They're not wrong in stating that a philosopher is a scientist. They expect big changes from philosophers, though they might seem like tiny steps of change, and they're not wrong about this either.

"The philosopher is the person who takes certain ideas and tries to convince people, making so that through his words only, the whole world believes the same thing. He always searches within himself by making some inventions that can change the world. The philosopher gives his thoughts and even if it's just a sentence it can provoke great changes. One of the most famous philosophers is Albert Einstein. He was famous for one of his theories, the relativity theory. For me, Neil Armstrong can be considered a philosopher. When he first stepped on

the Moon he said 'This is a small step for a human, but a hug leap for humanity.'"[2]

Like their teachers, they also think that philosophy helps their general development, that it helps them get better in all their subjects.

They have felt like they're philsophers when they scored, when they skied, when they played the guitar, when they figured out the rule of multiplication by 9, when they learned how to write, when they give friends advice, etc. It's not naïve, childish thinking. We adults should know how to read what they haven't spoken with words. In their minds (in which we should believe firmly that they can make wonders) they have rationalized, analyzed, calculated, changed opinions, created situations and managed to do what they want and what they have worked hard for.

They think philosophy influences people's minds and though they express this with their typical vocabulary, they believe that philosophy strongly influences their thought, their logic and their reflections.

"We pupils always ask our teacher to give us a difficult problem. When we read them for the first time we feel like nothing makes sense, but later, after a quarter hour or more I manage to solve them. I go up to the blackboard and I explain my solution. There are other moments where I feel like a philosopher. My and my friend's dream is to become scientists. To invent rockets that will have the speed of light to discover other galaxies and planets that could host life. We want to go inside the black holes or travel in time. I think that if this thing happens, it could really change the people's and the world's thoughts."

There are those who say they have felt like phliosophers since *"age 4, 5, 6"*, aligning their statement with M. Tozzi's statements that from the moment they are born, with a deep desire to know the world, children are philosophers, showing us adults how little faith we have in their abilites, making us think that we should continuously xhange and develop our perceptions.

There are other pupils who, after lauding philosophers, say they themselves have never felt like philosophers. In such cases, us adults

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[2]According to Poggi, "It's not bad to teach the children elements of philosophy. This makes them use their brain in a critical way. Children should understand that philosophy entangles with teh history of ideas, the development of critique and reasoning, and even with the big scientifics discoveries. This is the only way to grow the critical sense of the little pupils."

should be ridden with guilt for not making them understand that they are philosphers already. In the worst case, with what right do we take away their chance to become philosophers?!

After reading the answers fo the children, you can't help but reach the same conclusion as M. Tozzi with his French pupils, that

> *… there is a capacity of reflection in them (the pupils) that sometimes amazes the rest of us adults.*

Conclusions

Today we wish to become free European citizens, but what we should change in the first place is our mindset. Let's start today the road to this change, starting with the marathoners that will run towards the future: our children.

The philosophy for children is an educational practice that seeks to develop the critical, creative, and refeltcive thinking of children of any age. It appeared as a way to revive the educational branches, maybe even through doubts and arguments. The taught elements of philosophy help children realize that philosophy entangles with the history of ideas, with the evolution of critique and reasoning, and also with the big scientific discoveries. It is an experience that many countries have adapted already, but beyond this fact, there is nothing serious that can stop the teaching of philosophy to children. What makes us accept the philosophy for children as a solution and believe in it, is that this discipline has great potential of developing the reflective, critical, and creative thinking. The means of logic and reason are well-developed within that frame.

Following the idea of M. Sasseville, the philosophy for children is or should become a branch of philosophy, with the aim to reframe the presentation of philosophy in a necessary and fun way for children. The main objective is to offer them the possibility of thinking better in all other disciplines that are taught in schools.

What the philosophy for children can achieve, according to M. Tozzi, is the teaching of reflective thinking, the development of linguistic activity, the evaluation of ethical communication, and even the challenging of philosophy itself and the way that it is taught. When speaking of experience analyses and solutions to problems, it wouldn't be wise to expect a deep psychological functioning of the children. They are, after all, kids, and withing their thoughts rests the

imagination which shouldn't be suppressed, but they should learn that this poetic side should develop along the reasonable and conscient side. In order to not obstruct the children's freedom of thought and to push for its further development, our teachers need to train in the frame of the philosophy for children. We are lucky to have faculties of human sciences and prepared academic staffs that possess all the necessary capacities to facilitate this training, and why not, to create similar spaces like A. Delsol'satelies that prepare teachers for the philosophy for children. In order for this training to not arrive so late, the faculties of human sciences should consider the curriculum of the philosophy for children as a part of the subjects and courses that they offer.

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THE PERCEPTION OF STUDENTS ON THE QUALITY OF TEACHING IN UNIVERSITIES: CASE STUDY: UNIVERSITY "FAN S. NOLI"

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Abstract

Teaching in Rep. of Albania is organized on the basis of the 2015 Law on Higher Education. The law provides for several goals which determine the main goals of its operations. Article 2 point ç states: "This law aims to establish sustainable quality assurance mechanisms in higher education institutions, in accordance with European standards." Among the seven important goals and laws, the quality aspect is seen in the higher education institutions.

The purpose of this research paper is to identify the perception of Albanian students about the quality of teaching and learning in the university through the standards that are predetermined in the internal quality assurance.

The methodology used in this paper is the combination of quantitative and qualitative method. The qualitative method will be used in finding or consulting the standards of internal security in higher education and the quantitative method will be used for direct measurements through the survey that will be conducted at the University "Fan S. Noli".

The compatibility between the two documents can be indicated by comparing the quality assurance standards in the European Union set out in the relevant guideline with the internal safety standards of the quality code in Rep. of Albania. This shows the orientation of the national policy of higher education in the Republic of Albania according to the norms and standards of the European Union. The students' perceptions of the quality of teaching change depending on the measuring component. For some components, perception is positive, while for others perception is negative.

Keywords: quality, university, education, standard, perception.

Introduction
Teaching in Rep. of Albania is organized on the basis of the Law on Higher Education of 2015(Official Bulletin of Republic of Albania, 2015, law nr. 80, "*for higher education and scientific research in higher education institutions in the Republic of Albania*"). The law provides several goals which define the main purposes of its activity. Article 2 point ç states: *"This law aims to create sustainable quality assurance mechanisms in higher education institutions, in accordance with European standards".* The aspect of quality in higher education institutions stands out among the seven important goals and laws.
Quality aspects include a variety of standards which must be applied to have an effective university environment. Standards include key competencies related to the teaching and learning process such as communication and expression competencies, critical thinking, learning; personal, civic or digital competencies remain elements that higher education institutions need to develop in students through curricula, support facilities and trained pedagogical staff.
Teaching is exercised by the lecturer who has three functions "to teach, to conduct research and to manage" (Brown & Atkins 2002, pp.1).
The three components must coordinate with each other to turn teaching not only into an effective process but also a process with high standards and quality. "Quality, quality assurance and the teaching itself provide opportunities for a range of interpretations" (Ellis1993, pp.16). According to Ellis (1993), quality assurance basically means the achievement of a set of standards that are specified and possible to be realized in a certain product or service. On the other hand, the concept "quality" can be defined as a standard but also as "the best". According to British Standards Institute by "quality", we mean "the totality of the characteristics of a product or service that carries its ability to satisfy the stated or implied needs" (Ibidem.).
Quality standards must meet several attributes. They must be: "effective, empowering, fair, sustainable, appropriate, guaranteeing well-being and security" (The Commonwealth 2017, pp.3). These principles are essential for building quality standards that guarantee productive higher education systems in order to promote and develop the education sector regardless of the time or place where this system

is applied.

In today's globalization, the use of information technology, alternative teaching methods, inclusiveness, the use of innovative or flexible teaching techniques, remain elements that should be seen with priority, especially in the field of higher education. The proper application of the above standards, competencies and methods in university settings brings advantages and promotes the training of students for their preparation in the labor market in the future.

Quality assurance for the teaching and learning process in higher education should include both the learning environment and opportunities for the development of innovative ideas, critical thinking and research training. Teaching (Dictionary of Albanian Language 1980, pg.1131) itself is an organized work, which includes a program, a method and requires their application through quality. That's exactly what this paper aims to bring; a perception about the quality of teaching and learning in higher education institutions.

Quality assurance in higher education at European level is achieved at three levels (Roxana Sârbu, et al 2009, pp.386). These three levels correspond to:

- institutional level (orientation towards a culture of quality education),
- national level (orientation to develop relations between all national factors)
- European level (orientation towards higher teaching standards to be able to compare with universities in the US, Japan, China, etc.).
- Teaching and learning, which are realized through quality assurance should be focused on the students. Stimulation and motivation of the student leads to self-reflection and engagement of the latter in the learning process.

Higher education aims to prepare students for the job market, their personal development, career development opportunities and the stimulation of innovative ideas. The difference in the realization of these aspects is made by the quality of their application. Quality summarizes the results of the relationship between teaching staff, students and the university environment. In order to achieve quality assurance, a series of documents have been prepared at the international and national level which identify the standards,

competencies and criteria on the basis of which teaching and learning should take place:

1.   Standards and Guidelines for Quality Assurance in the European Higher Education Area[1](European Association for Quality Assurance in Higher Education et al,2015).

2.   Quality Code in Higher Education in Rep. of Albania(Official Bulletin of Republic of Albania, decision No. 531, 2018, "*For the Approval of the Code of Quality in Higher Education*")

3.   Law on Higher Education and Scientific Research in Higher Education Institutions in the Republic of Albania(Official Bulletin of Republic of Albania, 2015, law no. 80, "*For higher education and scientific research in higher education institutions in the Republic of Albania*",)

The above three documents serve to regulate the whole teaching and learning process. Standards and guidelines for quality assurance in the European area also serve as a basis for other documents at the national level. The quality code is the basic document that regulates, evaluates and ensures the quality of teaching in the Rep. of Albania. The law on higher education is the regulator and sanctioner of all relations that are built in the field of higher education. Quality assurance of higher education is provided in Chapter Xof the Law on Higher Education. Quality assurance is realized when the internal assurance, external quality assurance and accreditation process is performed.

Standards For Internal Quality Assurance In The European Higher Education Area

To determine the standards set in the European area for the quality of higher education we will refer to the document from the Bologna follow-up group of September 2014, which was approved at the Ministerial Conference in May 2015. This document is known as: "*Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG).*This document was prepared by the European Association for Quality Assurance in Higher Education

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[1]https://enqa.eu/index.php/home/esg/

(ENQA)[2]in cooperation with the European Students Union (ESU)[3]. Internal quality assurance standards(European Association for Quality Assurance in Higher Education et al, 2015, pp.12) in the teaching and learning process are based on:

- Study programs according to the principle that the student has an active role.
- Teaching and learning should focus on flexible teaching methods.
- The teacher should encourage innovation and the use of new technologies.
- Preparing students for their training in the global labor market.
- University activities should strengthen the link between education and research (theoretical and practical aspects).
- Pedagogical staff should flexibly use a variety of pedagogical methods.
- The teaching staff encourages a sense of autonomy in the learner (student) to develop critical thinking, problem solving and training in high level digital competencies.

Internal Quality Assurance Standards In Higher Education In Rep. Of Albania
Internal quality assurance standards in the Republic of Albania are defined in the Quality Codeof higher education(Official Bulletin of Republic of Albania, decisions No. 531, (2018), "*For the Approval of the Code of Quality in Higher Education*"). The code states that:

1. Academic staff uses alternative forms, ways, methods and opportunities of teaching and learning, implementation of new methods, as well as includes interactive, comprehensive and discussion methods.

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[2]The European Association for Quality Assurance in Higher Education (ENQA) is an umbrella organisation which represents quality assurance organisations from the European Higher Education Area (EHEA) member states.
[3]The European Students' Union (ESU) is the umbrella organisation of 46 National Unions of Students. The aim of ESU is to represent and promote the educational, social, economic and cultural interests of students at the European level.

2.   Theoretical and practical training modules and activities enable the acquisition of cross-curricular knowledge, skills and abilities, critical thinking, problem solving in concrete contexts, as well as qualitative orientation in work experience.

3.   Academic staff and students use various IT systems and consolidated IT infrastructure.

4.   In the function of teaching, the academic staff uses online platforms (e-learning) as well as access to online libraries.

5.   The teaching process should equip competencies that respond to labor market needs and facilitate student employment.

6.   Forms and methods of teaching should encourage a sense of student autonomy.

7.   Academic staff combines teaching forms to develop innovative ideas, advanced research and scientific studies and support students with collaborative institutions to enable and increase student mobility.

Based on the internal quality assurance standards set in the European and national space, it's clear the compatibility between them. We can emphasize that the quality code of the Republic of Albania is essentially a reflection of European standards. What is understood by these standards is that:

- Standards put the student in focus

- The teaching and learning process should create autonomy in the student.

- The standards define the use of alternative teaching methods as well as the promotion of the use of technology in this process (e-learning education).

- The teaching process should alternate between theory and practice and not be limited to one aspect.

- The teaching process should guarantee the student's preparation for the job market.

To see how these internal quality assurance standards are applied in public universities, a survey was conducted with students of the University "Fan S. Noli".

Survey results

216 students from all levels of study at "Fan S. Noli" University were randomly selected to conduct the survey during the period May 2nd to 6th 2021.

The surveys are closed, the answers were asked to be given only through the alternatives set in the answer possibilities.

The Likert technique was used for most of the required answers.

The survey data show that 48% of respondents are female while 52% of them are male.

In terms of age, 26% are 18-19 years old, 44% are 20-21 years old, 18% are 22-23 years old and 12% are over 23 years old.

Regarding the study program, 54% are in the bachelor study program, 27% of the respondents are in the Master study program and 19% are in the two-year professional study program.

Of the surveyed students 44% live in cities while 56% live in rural areas.

The survey data show that 62% of students say that their professors use traditional teaching methods, 14% alternative methods and 24% use both traditional and alternative methods. The graph easily shows the tendency to use traditional methods in teaching

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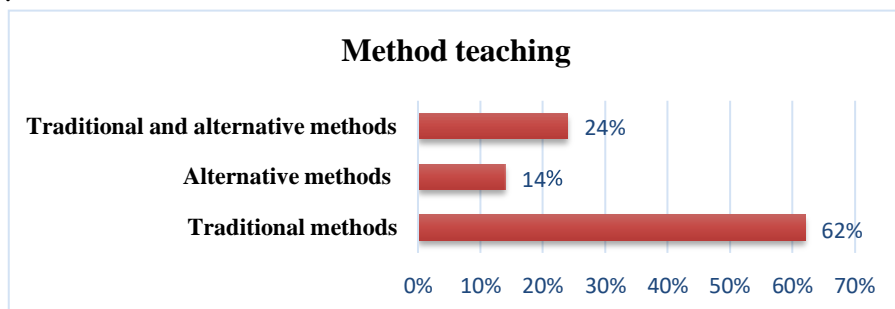
When it comes to the professional level of teachers, students say that 33% of them have a very good level, 37% a good level, 26% an average level, 2% a poor level and 2% a very poor level. From the answers we can understand that the professional level of teachers is satisfactory since about 70% of them assess that the professional level of teachers is very good or good.

Professional level of teachers

3% 3%

26% 33%

37%

■ very good level ■ good level ■ average level ■ poor level ■ very poor level
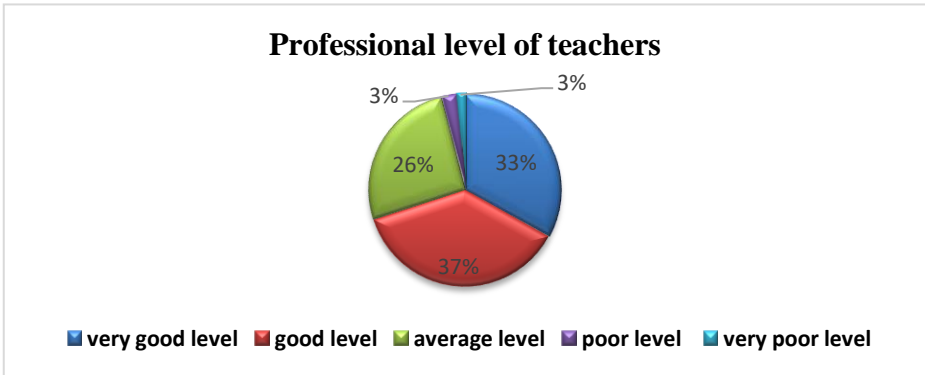
To the statement that "the academic staff promotes interactive methods of discussion and inclusion among students", 30% of students answer that they strongly agree, 41% agree, 18% sometimes yes, sometimes disagree, 9% disagree and 2% strongly disagree. Even in this case, most agree with the motivating role and the creation of an interactive environment in the auditorium (71% of respondents agree with this statement).

The academic staff promotes interactive methods of discussion and inclusion among students

50%	
40%	41%
30%	30%
20%	18%
10%	9%
0%	2%

strongly agree   agree   sometimes yes, sometimes disagree   disagree   strongly disagree
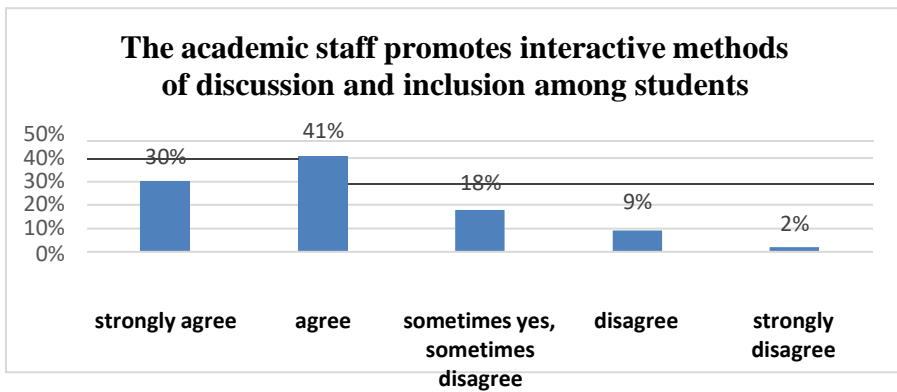
Regarding the communication between the academic staff and the students, 41% of them say that they are very good, 32% are good, 19% average, 6% poor and 2% very poor. Most about 73% are satisfied with the academic staff-student communication. However, there is also a proportion of 27% who say they have average (neither very good nor very poor) or poor communication with the academic staff.

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The communication between the academic staff and the students

(chart: very good 41%, good 32%, average 19%, poor 6%, very poor 2%)
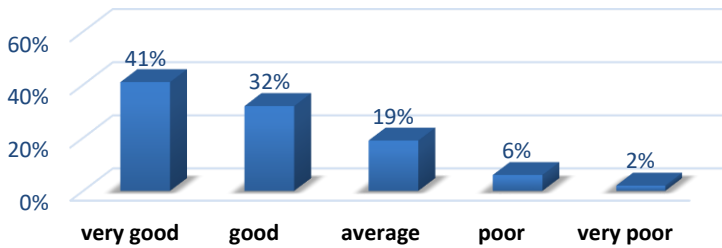
For the use of different information systems for the realization of the learning process, 13% strongly agree, 21% agree, 45% sometimes yes, sometimes no, 13% disagree and 8% strongly disagree. When it comes to using IT in the learning process here student responses tend towards averaging the response. Most students say that different IT systems are sometimes used sometimes not during the learning process.

The use of different information systems for the realization of the learning process

(chart: strongly disagree 8%, disagree 13%, sometimes yes, sometimes no 45%, agree 21%, strongly agree 13%)
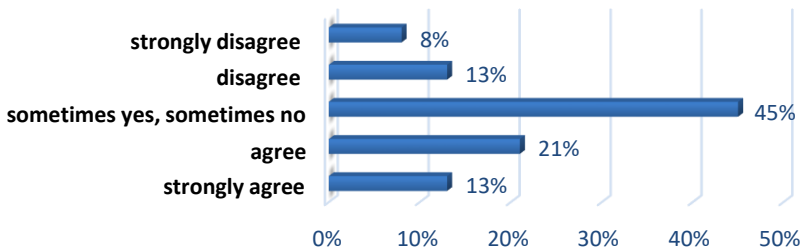
Asserting that "the University offers teaching through the method of e-learning (online)", 100% of them say that the University offer teaching through the online method.

The University offers teaching through the method of e-learning

0%

100%

■ yes   ■ no
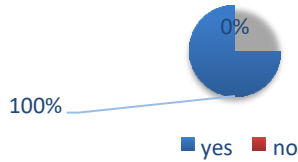
For research facilities or environments for innovative ideas 68% of students say that they have not been part of such an activity, while 32% respond positively. Through the answers it can be evidenced that most students are not involved in scientific research of the University, not creating the opportunity to meet the standards for quality assurance especially in scientific research and the principle of autonomy that the university should create in the student.

Research facilities or environments for innovative ideas

32%

68%

■ yes   ■ no
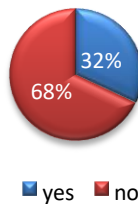
In order to provide exchange opportunities, 57% of students say that the university offers opportunities, while 43% that the university does not offer exchange opportunities. In the case of student exchanges their response is average.

Exchange opportunities

43%   57%
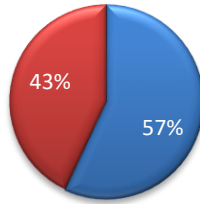
■ yes   ■ no

Regarding the statement that students feel prepared for the labor market from teaching at the University, it turns out that 46% agree with the statement, 22% somewhat agree, and 32% agree little or not at all. There's a slight difference on the agreement on the perception of student preparation for the labor market.

Students feel prepared for the labor market

agree	somewhat agree	agree little	not at all
46%	22%	12%	20%
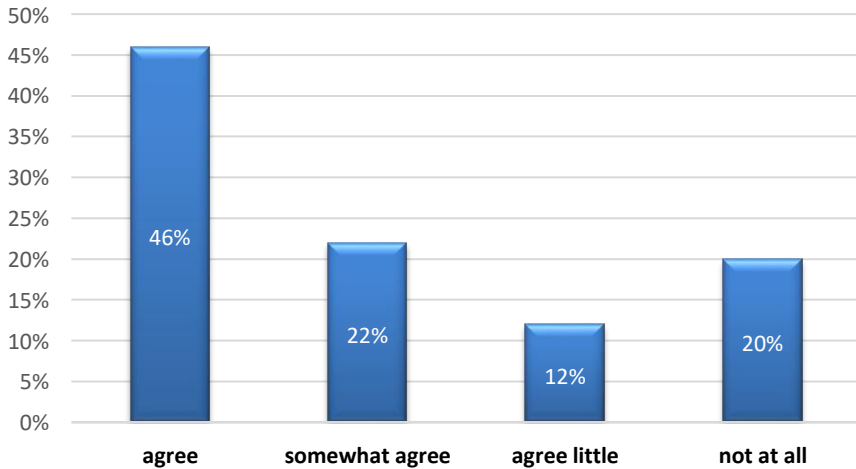
To the statement that "the University offers support for student employment" 16% of students answer that they strongly agree, 33% agree, 39% sometimes yes, sometimes disagree, 10% slightly disagree and 2% strongly disagree. Even in this case, the student response is average on the role that the University plays in supporting student employment.

The University offers support for student employment
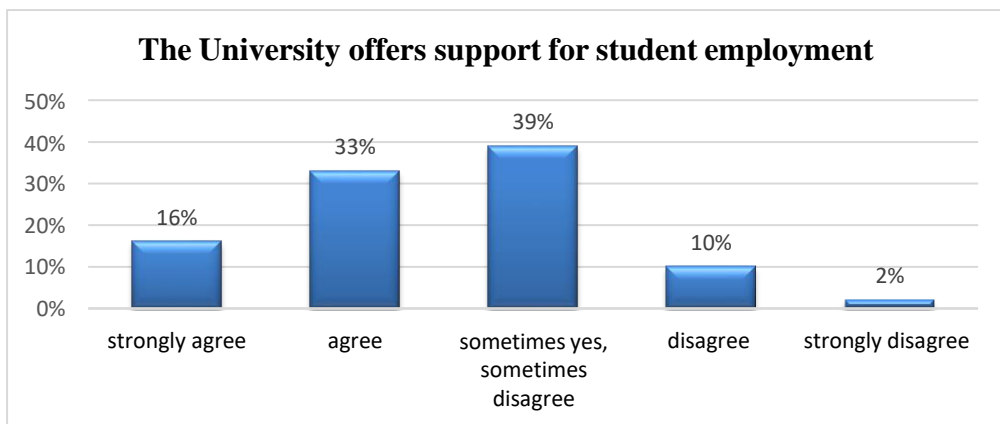
Conclusions and recommendations

By comparing the quality assurance standards in the European Union set out in the relevant guide with the internal quality assurance standards of the quality code in Rep. of Albania, we can attest to the compatibility between the two documents. The orientation of the national policy in this case at the macro level (orientation towards the EU of Albania), is evidenced in the smallest standards which are related to higher education, specifically in the internal quality assurance of educational institutions.

Regarding students' results, their perceptions cannot be taken as conclusions about the possibility of radical changes in the way teaching is provided, but they indicate shortcomings and can serve as an important tool for assessing the current situation and orientation for meeting the standards.

Based on the researched materials, the analysis performed, state documents (laws and decisions), guidelines, and data collected from the survey conducted at the University "Fan S. Noli", we can say that

students' perception of the level of teaching varies depending on the measuring component.

In order to achieve the best standards, some recommendations must be considered. There are some areas in which the need arises to improve or change the current situation. Consequently the main challenges are:

    1.   The pedagogical staff should be more oriented towards modern alternative methods of the teaching process and greater use of technology in this process.

    2.   The teaching staff should be more oriented towards class discussion, inclusiveness, problem solving and the development of critical thinking (i.e. promoting student autonomy)

    3.   Review of how to support students in the labor market after graduation.

    4.   Increasing students' access to the research process.

    5.   Increasing opportunities for student exchange, i.e. providing mobility.

    6.   Alternating theoretical teaching with practical teaching.

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TEACHING MATHEMATICS DURING THE PANDEMIC

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Abstract
The pandemic situation brought about changes in many aspects of life. This situation also affected the teaching and learning process.This study aims to discover how math teachers organized teaching mathematics during the pandemic period using specific methods. LSE (Lower Secondary Education) and USE (Upper Secondary Education) math teachers from different cities and villages in Albania were included in the study's survey. The gathered data analysis, lead us to focus on 3 main issues, a) specific methods of teaching mathematics online, b) support for students during online learning, c) the impact of online learning on the revision of mathematics teaching methods. Lastly, we draw conclusions with regards to the way the pandemic might have changed forever the way mathematics is taught and learned. We hope these conclusions prompts math teachers to reconsider their current teaching methods.

Keywords: e-learning, COVID -19 pandemic,teaching mathematics, learning mathematics,mathematics teaching methods.

Introduction
Covid-19, the worldwide headline of the last two years, could not but touch our country. What started as something small in faraway China

two years ago unfortunately became part of ours as well. In the days we talk about, we have already learned to live with this pandemic, when we turn back time, we see how everything has affected our lives.

Covid-19, from a scientific or medical point of view is a viral disease caused by the SARS-COV2 virus that is transmitted through close human contact.

It is mainly manifested by respiratory symptoms, cough, fever, pronounced physical fatigue or headache. It has been proven that it is extremely individual the way everyone reacts to the infection, encountering both in mild forms passed simply with vitamin therapy to severe forms that go to hospitalization or those with fatal end, loss of life.

In terms of impact in Albania we could say that the pandemic has had an impact on every aspect of life, be it health, social or economic.

Influenced the increase of life losses, the increase of morbidity, the economic fluctuations without leaving aside the social impact, the impact on the psychology of the population, leaving a negative effect on our mentality.

Drawing a parallel with January 2020 we could say that today, when the information about this pandemic is much greater, the way we are supporting it is many times easier, both medically and psychologically, as it is the population can afford it.

The pandemic also had an indisputable impact on the teaching and learning process.

Case study
Teaching and learning have always been and will always remain two basic and very important elements of education that directly and indirectly affect the development of a state. In recent years, researchers in the field of education have focused on the changes that teaching and learning must have, in line with the socio-economic and technological development that human society has undergone around the world. Teaching and learning methods although not changing at a rapid pace, they are revised from time to time always introducing new more productive elements. Today technological development opens a window on new methods of teaching and learning. Even in our country in adaptation to other countries in Europe and beyond it is necessary to study these methods. One of the new teaching methods adapted to this

development can be said that is online teaching. This teaching method should be studied in detail in terms of the advantages and disadvantages it presents. But the situation created by the pandemic which started in March 2019 found us unprepared in terms of online teaching and learning. The pandemic situation left us no time to discuss or study whether online learning is a good solution or not. To apply online teaching methods in another situation we had to have volunteer teachers and students. In our case, virtual teaching was extended to every school and implemented by all teachers and students. Whether willingly or not everyone chose online learning as the only alternative to enable the development of the learning process.[1],[2],[3],[4],[5]

Influenced by the situation created by the COVID-19 pandemic, we chose to conduct a study in terms of teaching and learning mathematics in our country during the period March 2019 - June 2021.

During this period the teaching mainly took place combined online teaching and school teaching.

Initially teachers were under a lot of pressure to make quick decisions on;

• creation of virtual classrooms,
• orienting students to use digital tools in the most effective way,
• use of platforms,
• cooperation with students and parents,
• development of lessons even if the technological means are limited,
• implementation of new virtual teaching methods,
• assessing students with new methods

Methodology

The methodology used in this study are questionnaires for teachers and students of lower and upper secondary education in different cities of Albania. The compilation of questionnaires was based on 3main issues; a) a) specific methods of teaching mathematics online, b) support for students during online learning and support for students who have difficulty in the subject of mathematics or are in difficult conditions to be part of online learning, c) the impact of online learning on the revision of mathematics teaching methods.[1],[2],[5]

Three questionnaires were developed, two of which were for teachers and one for students. There were 15 questions in the first questionnaire, 16 questions in the second questionnaire and 14 questionsin the third

questionnaire.Questionnaire completion were completed by32 teachers of Lower Secondary Education (LSE), 13 teachers of Upper Secondary Education (USE), 164 students of Lower Secondary Education and 29 students of Upper Secondary Education.Collection of data was done through GoogleForms and Data processing completed in SPSS (version 20). The first and second questionnaires related to Mathematics teachers werecompleted by 42 female teachers and only 3 male ones.Themajority of teachers about 70% that have completed the questionnaires are teachers in Lower Secondary Education. Regarding the third questionnaire about 85 % of the students were in Lower Secondary Education. For further refer to the table 1 and chart 1.

Table 1.Data on the completion of questionnaires by teachers

Teacher					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	USE	13	28.9	28.9	28.9
	LSE	32	71.1	71.1	100.0
	Total	45	100.0	100.0	
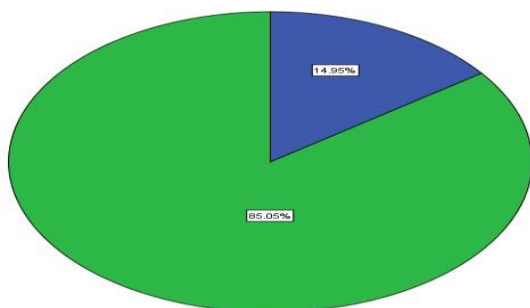
Chart 1.Data on the completion of questionnaires students

Given thatthe teaching process in our country for 2020-2021 was conducted in three methods;a)combined School premises-online (primarily in cities and urban areas whereby the number of students is very large), b) in school premises with small groups (in cities whereby the number of students per classroom is small), c) only in school

premises(primarily in villages – rural areas whereby the number of students is small). Therefore one of the questions for teachers asked in the first questionnaire is: How was the teaching process conducted in your school for the academic year 2020-2021**?**

From the answers of the teachers,we noticed that 68.9% have developed combined teaching, 22.2% in the school premises with small groups and 8.9% only in the school premises.We noticed that the percentage of combined teaching is high. This helps us to draw conclusions about how we can see this teaching method in the future. The situation created by the pandemic found the teachers unprepared to conduct the teaching online.However, more than 50% admitted that they were "well" prepared to conduct the teaching process through online channels like Google Classroom, Zoom (a platform most commonly known for ease of usage, School me, WhatsApp (which follows up as an easily accessible platform through smartphones by students and teachers), Akademia.al (controlled and managed by MASR and had the most widespread usageespecially in the second year of the pandemic). Online learning greatly promoted the use of technology for teachers, students and parents**.**

The essentiality of conducting the teaching process, incentivized the teachers towards searching new methods of teaching also in other countries. 72 % of the teachers say that they have researched on new methods of online teaching that are also used in other countries during the pandemicand 62% of teachers have used these methods with their students too.

Online teaching incentivizes teachers to combine new teaching methods, which include the usage of digital equipment and online platforms, with traditional mathematics teaching methods. However, teachers indicate that they need base materials as well as trainings on platforms, programs or usage of digital equipment.

Approximately 83% of teachers indicated that they "Completely" or "Partially Agreed" with the statement that online teaching made possible the conduct of the teaching process in this difficult year.Mathematics teachers deemed the topics related to geometry, algebra and functions as difficult to be conducted through online methods and topics related to numbers, statistics and probability can be developed easier through online methods. From teachers answers it is understood that there are students nowadays which find difficulties with the usage of technology or of platforms utilized during the online teaching process. However, it becomes apparent one of the advantages of online teaching. Students can hear a few times the teachers explanations, made possible through the recording option of the utilized platforms. This is an option that can be used when a student is absent or needs additional hearings of explanation for purposes of better comprehension. Refer to the chart 2 about 73% of teacher responded "yes" about what we put forward.
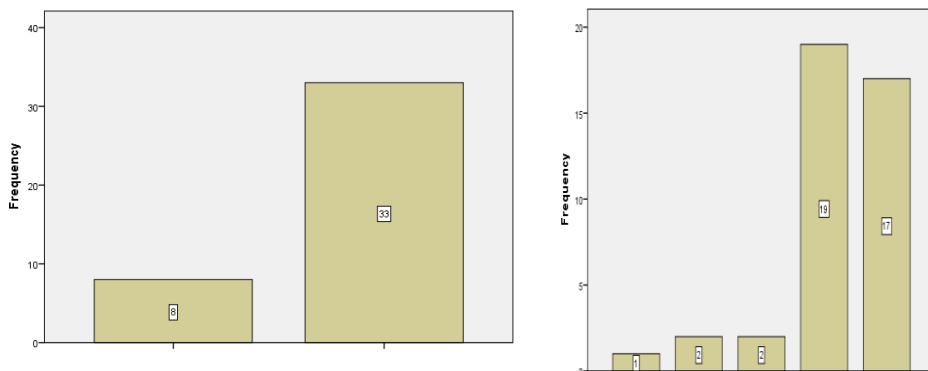
Chart 2. About the advantages of learning online
Chart 3. Student-teacher relationships

The pandemic impacted as well teacher – student relationships. Students have collaborated more with their teachers driven by the fact that the teaching took a new, previously unrecognized form.There are 36 teachers "agree" or "partially agree" that online learning affected relationships with students. Refer to the chart 3.

The majority of students saw the online teaching process as an innovation. Some of the elements that students found enjoyable about online teaching are; a)additional and interesting information during the teaching class hour,b)sufficient time to hand over the homework and classwork, c) new evaluation methods. Refer chart 4.
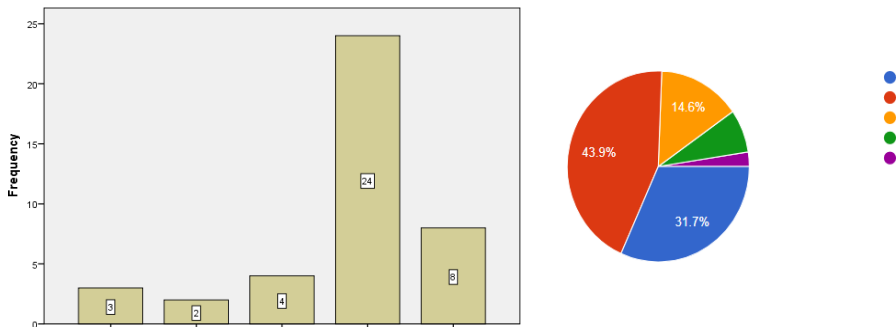
Chart 4. The online teaching process as an innovation
Chart 5. Student motivation during online learning

During the online teaching, students are mostly motivated by the change in evaluation method of the teacher on their homework/classwork and achievements. This valuation is driven by the frequent communication that the teacher has with the student or by positive comments on uploaded tasks on the teaching platform.Regarding this we presented 43.9% of teachers say "completely agree", 31.7% "partially agree", 14.6 % "I'm not sure" and the rest "I do not agree" or "do not agree at all". Refer to the chart 5 for the further.

Another important point in this study is how teachers view online learning for students with special needs. The majority of teachers indicate that online teaching makes more difficult the process for students with special needs.The learning process for students with special needs was developed mainly by the assistant teachers and through communication with their parents, however a part of the teachers have attempted online teaching methods as well. The communication, support, and valuation by teachers for students with special needs has been very correct, 46.3 % of teacher responded that they have taken great care of these students. Then,the majority of teachers expressed that online teaching can be a solution for students with special needs that can't participate in classroom teaching.Referto the chart 6 and chart 7 as following.
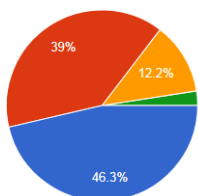
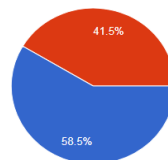**Chart 6**. Teacher support for student needs solution

Chart 7. Online education as a students with special needs

The question: Do you think that combining some elements of online learning with classroom teaching will make the learning process more attractive to students?

The answers of teachers related to combining a few elements of online teaching with classroom teaching to make the teaching process more attractive for students are very promising. Below we list some of the suggestions they make in combining new teaching methods through technology and traditional classroom learning

They suggest to implement during the teaching class hour:

● PowerPoint presentation
● Presenting videos related to teaching topics
● Accepting homework/assignments or projects of students online
● Communication through platforms regarding questions that students can have related application of knowledge received in class
● Sending the teaching material prior to class hour, and reinforcing the explanation in classroom through exercises and assignments.
● Evaluating students through tests or online assignments.
● Online tests or questionnaires to reinforce knowledge.

If we focus on the questionnaire for students, then approximately 65% of students expressed that they do not find difficulties in using technological devices and online platform, 28 % encounter some difficulties and 7% fully agree on the difficulty of their usage.70% of students emphasize a positive aspect of online teaching related to the possibility of re-watching and re-hearing teacher explanations.

There are two additional aspects for students related to online teaching, a)communication with teachers even after the explanation over

questions, difficulties or things unclear that may appear during the development of the teaching topic, b)instructions and various demonstrations by teachers for understanding and applying the received knowledge.57% of students see online teaching as an innovation in education that incentivizes as well the technology usage, platforms and online platforms improving skills, 13% are unsure, 30% do not agree.In terms of student-teacher relationships through online learning students have responded; 52% think that during online teaching the teacher-student relationships are reinforced, 18% are unsure and 30% do not agree.

Some positive thoughts of students about online learning that appeared during the studyemphasize that73 % of students think that online teaching provides sufficient time to deliver the homework assigned by the teachers and that the additional or interesting materials that the teachers provide make the classroom teaching hour more enjoyable and 68% of students think that online teaching elements combined with classroom teaching will make the teaching process more interesting and effective.

Anyway, approximately 57,5 % of students think that classroom teaching is more productive, but they wish to combine with it elements used in classroom teaching, 22,3 % do not want to change the classroom teaching method and 20,2% of students are unsure over the usage of newmethods.

But, did online learning help us to overcome the gap created by the pandemic?

Approximately 66% of students "fully agree" andonly 7% of them "do not agree"with the statement that online teaching made possible the conduct of teaching process in the pandemic year. Through the responses it is noted the importance that the online teaching had in realizing and finalizing successfully the academic year 2020-2021, even though it cannot be stated that it substitutes 100% the classroom teaching.For more, see chart 8.
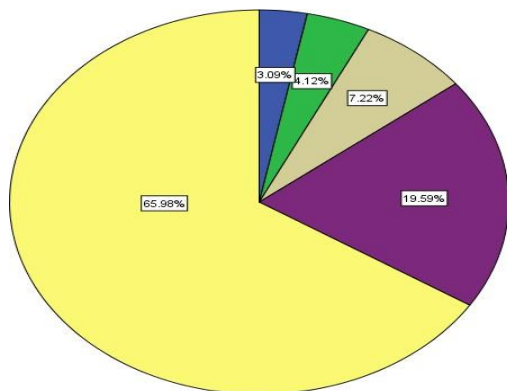
Chart 8. Online learning to help during the pandemic

Related with suggestions over some of online teaching elements which can be combined with the classroom teaching process to make it more interesting and effective, students identified the following:

- Additional information over the teaching topics
- Examples of application related to teaching topics.
- Videos, online quizzes
- Group work
- Submitting materials, homework or projects through platforms.
- Communications with teachers and students through platforms in assistance of the education process.

Conclusions

In this paper we studied the impact of the pandemic on teaching and learning math through online learning. For more, we see which of the elements of online teaching and learning are positive and which of them we can implement in our schools. After studying all three questionnaires and analyzing their data we derived conclusions on online teaching and learning as following:

- Helped in the realization of the teaching process in the difficult conditions created by the pandemic.
- Led teachers and students through effective usage of technology also in the subject of mathematics
- Incentivized teachers to search on new mathematics teaching methods adapted with current social and technologydevelopment.
- Impacted students over the learning methods and knowledge application

- Impacted over the performance evaluation methods of students and teachers.
- Built new communication bridges with teachers-students-parents
- Incentivized the review of teaching curriculum in pre-university and university education.

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THE SCHOOL PSYCHOLOGIST AND THE BENEFITS OF WORKING WITH THE STUDENT'S PARENT OR PRIMARY GUARDIAN

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School psychologists in the IAP in Albania are professionals educated in the bachelor and master cycle in psychology. In addition, they are licensed by the Order of Psychologists of the Republic of Albania to practice their profession in schools. They take care about the psychological well-being of students and provide direct assistance to key stakeholders. So, the profession of school psychologist is in the list of regulated professions and it is regulated by law no. 10 171. 2019 article 5 h).

According to the definition of the National Society of School Psychology (NASP), the Professional collaborates with teachers, parents and other professionals to create safe environments, supporting the learning process, also affecting the strengthening of the connection: home-school- community for all students (cited in Varoshi, 2013; 28). Professionals in the field build bridges of communication and cooperation with students, teachers, parents and the community as a whole. In order to provide individual assistance to school students, "informed consent" from the student's parent or primary guardian is necessary; this is in accordance with the code of ethics and the laws on the functioning of the school psychological service. In summary, it can be said that the school psychologist works to find the most appropriate solution for each student and situation (law no. 31 dated on January 28, 2020; page 14). In the meantime, in the following we will stop at the

professional relationship with the students' parents. For this reason, we can emphasize that specialists in the field constantly organize:

• awareness and information sessions for parents;

• serve as advisors for parents, both in terms of students' learning, and with a focus on helping to solve problems in the family, which affect the learning progress of students ("Practical guide for the protection of children in schools", Terre des homme; 2009);

• contribute to providing help to families, which are facing crises or traumas such as: deaths, illnesses of family members or other natural disasters, which can be massive in a certain community, at a specific moment (trauma from earthquakes, for example, "Guidelines for the first psychological intervention in the school context", University of Tirana, 2019);

• specialists work directly with children and their families to facilitate the adaptation and reintegration of children in need in the school environment ("Work manual for employees of the psycho-social service unit in schools in the pre-university education system", June 2020).

Key words: School psychologist, regulated profession, school psychologist-parent cooperation, student's learning-educational progress.

Introduction

School psychologists at the IAP in Albania are professionals educated in the bachelor and master's cycle in psychology and licensed by the "Order of the Psychologist of the Republic of Albania" to practice their profession in schools. They care for the psychological well-being of students and provide direct assistance to key stakeholders.

The school psychologist offers his service in a network consisting of several links:

1. The general directorate of pre-university education, which is represented by the leader at DPAP level for the school psychological service;

2. DRAP, which comes with the general coordinator for the service,

3. ZVA, which have their own well-structured units, which contribute to the smooth running of work in every IAP,

4. IAP in which practically every employee of this service contributes directly, according to order no. 150. dt. on April 03, 2018 for the establishment of the psycho-social service unit.

The profession of school psychologist is on the list of regulated professions. It is regulated by law no. 10 171. 2019 article 5 h), law no. 40/2016 "On the order of the psychologist in the Republic of Albania"; law no. 8480, dated on May 27, 1999 "On the functioning of the collegial bodies of the state administration and public entities"; The statute of the order of the psychologist in the Republic of Albania; Regulation for registration, membership and licensing in the Order of psychologists of Albania; Code of ethics and deontology; Regulation of professional disciplinary judgment; Regulation of continuing education in psychology; Election regulations; as well as through Order No. 31 dated on January 28, 2020 "Regulations for IAP, Article 31; VKM no. 578 dated October 03, 2018 for referral and case management procedures; Order no. 150 dated on April 03, 2018 "On the establishment of the psycho-social service unit".

The basic education and continuing education of school psychologists prepares them to provide a service of the highest quality for the benefit of the student-parent-teacher triangle. Professionals in this field, after the first licensing, must be equipped with a certain number of credits (minimum 100), to be re-licensed after five years. This obligation, regulated by law, keeps them engaged with new science and, as a result, they are always improving the service they provide for the target group. According to the definition of the National Society of School Psychology (NASP), the school psychologist helps children and youth succeed in school, in society, in solving emotional and behavioral problems. The professional collaborates with teachers, parents and other professionals to create safe environments, supporting the learning process, also influencing the strengthening of the connection: home-school-community for all students (cited in Varoshi, 2013 ; 28).

In the official address of the APA (American Psychological Association), school psychology is said to be the discipline of general psychology that deals with children, youth, families, students of all ages, and the teaching process.

In both of these definitions, a special place is given to the cooperation of the school psychologist with the family. Professionals of the field build bridges of communication and cooperation with students,

teachers, parents and the community as a whole. In order to provide individual assistance to school students, "informed consent" from the student's parent or primary guardian is necessary; this in accordance with the code of ethics and the laws on the functioning of the school psychological service cited above.

So, the school psychologist establishes regular contact with the family (in addition to the teaching staff and other members of the community), working from the starting point of each case, in close cooperation with the families and other members of the community.

After collecting the basic information, he makes the assessment. It is emphasized that the most problematic cases are referred to the CPU (Children Protection Unit) with the approval of the coordinator of school psychologists in the Regional Education Office, with a focus on helping to solve interpersonal or family problems that affect the learning progress of students. (Practical guide for child protection in schools, Terre des homme).

In summary, it can be said that the school psychologist works to find the most suitable solution for each student and situation (law on pre-university education 69/2012 and law no. 31, dated on January 28,.2020; page 14). These professionals work with students individually and in groups, depending on the specific cases presented to them.

Also, they develop programs to inform or sensibilize teachers and parents about effective teaching and learning strategies, adapt techniques to manage behavior in the family and in the classroom, work with students with disabilities or special talents, deal with drug and substance abuse and crisis prevention and management.

Besides these, let's stop at the professional relationship with the students' parents. Specialists in the field constantly organize awareness and information sessions for parents. Their main focus is related to child development and how it affects learning and behavior. They also work to find effective solutions to problems that arise in students in these two areas: learning and behavior.

These specialists serve as advisors for parents, in addition to teaching staff. After assessing the scholastic abilities and learning strengths of the students, they make appropriate recommendations to the parents of these students.

In any case when their help is requested, they offer counseling with a focus on helping to solve interpersonal or family problems that affect the learning progress of students. Of course, they are predisposed and contribute to providing help to families, which are facing crises or traumas such as: deaths, illnesses of family members or other natural disasters, which can be massive in a certain community, at a specificmoment (trauma from earthquakes, for example, "Guidelines for the first psychological intervention in the school context", University of Tirana, 2019).

These specialists work directly with children and their families to facilitate the adaptation and reintegration of children in need into the school environment. However, we must emphasize that all the work of these professionals is based on an essential primary step, which is related to the ability to create trust and form cooperation with parents ("Work manual for employees of the psycho-social service unit in schools in the pre-university education system", June 2020).

From what we mentioned above, we can say that psychologists, who work in schools, engage in a wide range of activities. *These activities include counseling, consultation, assessment, implementation of prevention and intervention programsdevelopment, referral to other professionals, assessment and management of critical incidents*.

They also provide information and psycho-education to students, school staff, the community, parents, careers and external stakeholders. We emphasize that school psychologists strive to work in a consultative and supportive manner with parents and caregivers, teachers, school administrators, and external health service providers. They always work with the main goal of achieving the best result for the students.

Effective school psychology service can only occur when it is fully supported, valued and co-operated by the entire school community and beyond.

The child's case can be referred to the School Psychologist by the teacher, parent, school leaders, the students themselves (representative or not of the Student Government), non-educational support staff, the police or the prosecutor's office. The official referral of the case is made when the designated referral form is submitted to the school psychologist.

This form, in addition to the summary picture of the problem accompanying the case, also provides information on the steps of the

work carried out practically with the child by the referring person, before continuing with the referral of the case. The school psychologist structures the work methodology for information on the case and its assessment, in an individual action plan. The specificity of each case affects the work procedure followed by the school psychologist.

This procedure, based on the unique needs of each case, can be through: *conducting observations, administering psychological tests with the student, consulting/interviewing* the main actors responsible for the child (parent/primary guardian or teacher), or all together.

After the collection of information on the case and its assessment by the school psychologist, an individual student file is opened. In the format of this file, the materials used to carry out the case evaluation process and the conclusions reached from their analysis are clearly listed. The file is accessible only to authorized persons, equipped with exclusive permission ("Ethics of the school psychologist", UP).

This file is accompanied by an action plan, which will be applied to the specific case. Meanwhile, for any case, which carries a problem beyond the limits of management by the school psychologist, after professional consultation with the Supervisor of School Psychologists at the level of the Local Education Office, the referral procedure follows accordingto VKM no. 578/2018.

According to decision no. 578, dated on October 03, 2018 of the Council of Ministers "On the referral and case management procedures, the drafting and content of the individual protection plan, the financing of expenses for its implementation, as well as the implementation of protection measures", the child in need of protection is referred in time (depending on the level of risk of the case, determined by the assessment of the school psychologist) [1]. This referral goes to the Child Protection Unit at the municipality level, or to the Child Protection Officer at the administrative Unit level.

Let's stop at the detailed clarification of the steps followed by the school psychologist.

After identifying the child in need of protection, by actors inside or outside the school, who report the case to the school psychologist; the latter takes measures for reporting. Initially, the school psychologist must report the case of the child in need of protection to the Supervisor for the School Psychological Service at the Local Education Office. With the approval of the relevant Education Office, the case is

transferred to the Child Protection Unit or the Child Protection Worker at the Administrative Unit level.

The reporting of the case can be done in writing by filling out the specific format (Annex 2, VKM no. 578. date on October 03, 2018) or in other forms such as: by phone, by e-mail, by mail, by contacting the Defense Employee of the Child.

Cases with risk level 1, 2, 3 must be reported within 24 hours from the moment of identification. However, cases with risk level 4 must be reported immediately by the school psychologist. If it was impossible to contact the Child Protection Officer or the Child Protection Unit, then the School Psychologist notifies the State Agency for Child Rights and Protection, as the structure responsible for the protection of children at the local level.

The school psychologist, in cooperation with the Child Protection Officer, supports and facilitates the implementation of the Individual Protection Plan within the educational institution (Article 25, VKM no. 578).

The school psychologist is part of the frequent meetings of the Intersectoral Technical Group, in support of the implementation and development of the Individual Protection Plan for the child in need of protection. In any case, the school psychologist takes the necessary measures so that the child has free didactic tools and continues his education normally.

As a summary conclusion, we state that:
• School psychologists areprofessionals, who, thanks to the proper qualification and training, manage to help in delicate personal and family situations, which are directly related to the well-being and progress of the student at school.
• School psychologists, knowing that cooperation with parents strongly influences the performance of students at school, always tend to build bridges of communication and cooperation with these primary caregivers.
• These professionals, through planning and early interventions in the learning process, in cooperation with the primary caregivers of the students, manage to prevent problems in the future.
• These specialists serve as counselors for parents, not only in cases of trauma, death, crises or natural disasters, but also in solving problems

in the family, which directly affect the progress of students at school and their mental health.

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TREATMENT OF AUTISTIC CHILDREN WITH INDIVIDUAL EDUCATION PROGRAMS

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Abstract
Autism is a neurobehavioral disorder characterized by impairments in social interaction, communication, and the display of stereotypical and repetitive behaviors of interest and activity.

The purpose of the study. To evaluate and argue the effectiveness of psychosocial services in the training and rehabilitation of autistic children through psycho-educational programs, techniques and scientific methods.

Methodology. For the realization of the study, semi-structured interviews with actors and factors that have access to autistic children were used. Focus group with specialists in the field who create the multidisciplinary group. Direct vertical grid observation with children constituting the study sampleResults. The Soner test proved that the mental age of trained children increased by 4 years. The mental age of untrained children increased 2.5-3.1 years. Achievements of 48 autistic children, treated with Individual Psychosocial Programs, in their rehabilitated areas as follows: Graphic presentation of the achievements of 48 autistic children that were tested shows that: In cognitive training 35% manage to progress with verbal help.

Language training is the most difficult dimension for autistic children to progress. The greatest achievement in this area of training is: 35% with verbal help, the third level of the Likert degree. The achievements of children trained in the social sphere turn out to be 25% with verbal help and 25% partially. Risky behaviors in exercised children are improved 30% with verbal help and 25% fully improved conclusions. Psychoeducational programs accelerate the psychosocial and psychophysical development of children with autism. Treatment and rehabilitation of children with autism spectrum disorders, with techniques and professional programs, is difficult but not impossible. Psychological treatment of autistic children with Individual Education

Programs (PEI)) argued accelerating the mental progress of autistic children.

Introduction
Autism is a complex neurodevelopmental disorder characterized by impairments in the areas of social relationships, communication, and behavior. (Micheal D.Powers 2000; Deborah Fein & Michel Dunn, 2007; Lynnan, C. Brennan. 2010)

Autism is manifested by severe communication disorders in social relationships and behaviors of a repetitive and stereotypical nature. It is often associated with mental retardation. People with autism are increasing in recent years.

Studies show that the prevalence of autistic disorders is increasing: In 1943 the birth rate of autistic children was 1/25000, in 1980 1/10000, around 2000 the births of children with autism were 1/1000, after 2004 1/150, in 2008 1/88 and in 2015 1/68, in 2019 1/55. The girl-boy ratio is 1 to 4.

In Albania there are no accurate data on the total number of children with autism. Due to the lack of disability studies it is difficult to accurately determine the number of children with disabilities. The collection of statistics is limited to those who benefit from disability payments and services in public day or residential centers.

The study on the effectiveness of psychosocial services in the assessment and rehabilitation of autistic children was conducted during the period: 2016-2019, in Community Mental Health Centers No.1 and No.3. The target group of the study is 48 autistic children, of which, 24 were trained with rehabilitation programs (PEI), and 24 were included in the control group. The study also includes a case study, where the SONE-R test assesses the mental age of two autistic children treated with Individual Educational Programs (PEI) and two children not treated with these programs.

The study addresses the effectiveness of psychosocial services in the training and rehabilitation of children with autism spectrum disorders (CAS), through the application of PEI, scientific psychoeducational techniques and methods. The study provides an overview of the symptoms, the hypotheses of the causes of birth and the functioning of

autism spectrum disorders. The study includes the most effective methods and therapies that currently treat autism in Western countries.

Literature review: What is autism?

Autism is a neurobehavioral disorder characterized by impairments in social interaction, verbal communication, and the display of stereotypical and repetitive behaviors related to interests and activities. (ÇSA)

According to the DSM-IV (APA, 1994) autism spectrum disorders (ACDs) include:

Autistic disorder or classic autism; Asperger's disorder; Rett Disorder; Disintegrative childhood disorder; Pervasive developmental disorder. Other disorders of ASD are considered variations on the theme of autism.

Some distinctive features, which are different for different children.

Autistic children have great difficulty communicating, or have stereotypical speech. When exercising with programs: Use ecolaline. They learn the names of objects more easily than people. They do not relate concepts to each other. They have difficulty understanding the language. They lack empathy.[1]

Autistic children prefer to stay alone. They lack the expression of emotional reciprocity. They have difficulty making eye contact. They do not smile. They make unpleasant gestures. They commit self-harming behaviors. They have difficulty realizing a collaboration. Manifested pronounced social isolation.[2]

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[1]Anderson, G. M., Hoshino, Y. (2015). Neurochemical Studies of Autism. In F.R. Volkmar , R. Paul, A. Klin, & D. Cohen, *Handbook of Autism and PervasiveDevelopmental Disorders, Volume 1* (p.430-464)New Jersey:John Wiley & Sons, Inc.

[2]Acquarone, S. (2007). *Signs of Autism in Infants: Recognition and Early Intervention*. London: Karnac Books.Fq.35-42;79-94;140-153

Autistic children do not react to the call of his name, this is a warning sign.[3] When the child is not intimidated by strangers, not yet 1 year old and does not pay attention to the departure of the mother or a close person from the place of residence, the parent should be concerned.[4] Studies show that incidents that occur during pregnancy or childbirth are more common in autistic children than in others. These incidents are thought to have a role in the development of this disorder.[5] In some cases a strong link is seen between autistic disorders and genetic affections such as phenylketonuria, sclerosetube reuse, neurofibromatosis, fragile X.

What Causes Autism?
The causes of autism remain unspecified. Data collected from neurological sciences and biology show that they are primarily of neurological or genetic origin. In 50% of cases, we seem to be dealing with an inherited tendency. The treatment aims at the maximum development of the person's potentials.[6]

A.-Genetic origin, B.-Autism caused by environmental factors. Research has focused on genetic factors; For example, the Paris Autism Research International Sibpair study is an international collaboration aimed at: Identifying the genetic factors that affect autism. This research has been undertaken by Marion Leboyer in France and Christopher Gillberg in Sweden, as well as many specialized clinical centers in France, Sweden, Norway, Italy, Austria, Belgium and the USA.

The study "Identification of new genes affecting autism and Asperger syndrome", conducted by the Thomas Bourgeron group at the Pasteur Institute, was conducted in 2013. He identified in two families, mutations combined with two genes located in X chromosomes that

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[3]Batten, A., Corbett, C., Rosenblatt, M., Withers, L., & Yuille, R. (2006). *Autism and education: The reality for families today*. London: The National Autistic Society.Fq.3-20;34-45;128;141

[4]Beytien, A.(2011). *Autism Every Day: Over 150 Strategies Lived and Learned by aProfessional Autism Consultant with 3 Sons on the Spectrum.* Arlington, Texas: Future Horizons.Fq.34-52;56-71;140-169

[5]Gillberg C, Wing L.(2000) Autism: Not an extremely rare disorder. Acta Psychiatr Scand 1999;99:399-406. Miles JH, Hillman RE. Value of a clinical morphology examination in autism. Am J Med Genet.Fq;91:245-53.

[6] Munib, H. Wiley, J & Sons, Incorporated (2019).

affect the formation of synapses. A mutation appears in the neuroligin 4 gene (NLGN4). In one family were two boys, one with autism and the other with Asperger syndrome. This mutation has been transmitted by the mother. Mutation of the NLGN4 gene affects the formation of a protein, which affects the formation of synapses during brain development.[7]

In another family, two brothers were affected, one with autism and the other with Asperger syndrome due to a mutation occurring in the neuroligin 3 gene (NLGN3). These genes encode information in proteins, which are located at the level of synapses. Researchers have identified specific areas on chromosomes that can cause autism in children.[8]

Experts estimate that there may be 10-50 genes that play a role in the development of autism that are located on the X chromosome. Researchers have observed that it is an X chromosome gene that is the biggest cause of autism. Mutations in many C chromosome genes cause autism or mental retardation.[9]

Researchers have also identified genes of fragile X syndrome and syndromes, Ret, NLGN3, NLGN4, ARX, CDKL5 and SLC6A8. At the same time it is thought that the syndrome is also caused by the environment. So the child is born normal, but becomes autistic.

Environmentally influenced causes of autism are: metabolic disorders, age of mother over 35, and father over 45, carbonated foods, gluten-free foods, poisons, chemicals and triple vaccine, used against measles, rubella and salmonella[10].

Thimorosal is present in vaccines. This product contains a large amount of mercury, an element that affects the nerves. The body of autists does not secrete excess mercury, as a result it causes developmental

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[7]Michael D.Powers (2000).Fëmijët me autizëm (udhëzim për prindërit).Shtëpia botuese Fondacioni Fëmijët Shqiptarë "Domenick Scaglione". ILAR. Tiranë, Fq.3-42; 175- 201; 272 – 293

[8] Siegel, B (2007). Help Children with Autism Learn: Approaches to Treatment for Parents and Professionals; Oxford University Press USA - OSO 2007.ISBN: ISBN number: 9780195138115

[9]*Debora Fein & Michel Dunn, (2007).Autizmi n*ë klasën tuaj. Shtëpia botuese : Fondacioni Fëmijët Shqiptarë"Domenick Scaglione" Shypshkronja ILAR.Tiranë.Fq.3-110; 112-195*;198-263.*

[10]*Lynnan, Cohen Brennan.(2010*) Shtëpia botuese :Fondacioni Fëmijët Shqiptarë "Domenick Scaglione"Shtypshkronja ILAR.Tiranë.Fq.2-55;58-110; 120-242.

disorder.[11] It has long been said that autism is caused by "cold mothers" as well as career mothers, who do not give their children enough love and care. This theory has been refuted. Numerous studies have been conducted and continue to be conducted to find problematic genes and some areas of the brain that are not functioning normally. [12]

Studies show that incidents that occur during pregnancy or childbirth are more common in autistic children than in others. [13]These incidents are thought to have a role in the development of this disorder. In some cases a strong link is seen between autistic disorders and genetic affections such as phenylketonuria, sclerosetu bereuse, neurofibromatosis, fragile [14]

Methodology

Aim of the study. To evaluate and argue the effectiveness of the psychological service in the evaluation and rehabilitation of autistic children through psycho-educational programs and therapeutic techniques.

Instruments: Collection and use of information for people with autism, was done through the following instruments: a.Observation; b.Focus group; c.Semi-structured interviews.

Tests: that highlight the results of autism are: SCQ - Communication Questionnaire "M-CHAT"; CAST – Asperger syndrome syndrome in childhood ESAT-Early autism examination; BINET; GRIFTH. Through the SONE-R Test - I determined the mental age of autistic children and recommended according to the mental age Psychosocial Programs (PEI) of autistic children.

Study limits. I think the study has as limits: a.Reduced sample size of the study; b. The number of institutions where autistic children are diagnosed.

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[11] Sue, A. Allen, M. (2020).Emotional literacy in the early years: Help children balance body and mind. ISBN: ISBN number: 9781912611201, ISBN number: 9781912611386.

[12]Saqellari.S.(2015).Autizmi në këndvështrimin psikoedukative.Sh. Botuese.Onufri.Tiranë.Fq15-63;65-120-127

[13]Rada.A. (2013). .Children with autism and the social aspect (Family impact) .Dissertation. Tirana.P.3.3-9

[14]Dhamo.M.(2010).Çrregullimet dhe Terapitë e të folurit. Shtëpia botuese. Pegi.Fq.127-144.199-237.

Study results

Achievements of 48 autistic children, treated with Individual Psychosocial Programs, in their rehabilitated areas as follows: Graphic presentation of the achievements of 48 autistic children that were tested shows that: cognitive training 35% manage to progress with verbal help. Language training is the most difficult dimension for autistic children to progress. The greatest achievement in this area of training is: The third level of the Likert scale with 35% with (Verbal Assistance) The achievements of children exercised in the social sphere results in 25% with verbal help and 25% partially Risky behaviors in children exercised are improved 30 % with verbal help and 25% fully improve **Figure. No.1. Cognitive training.**
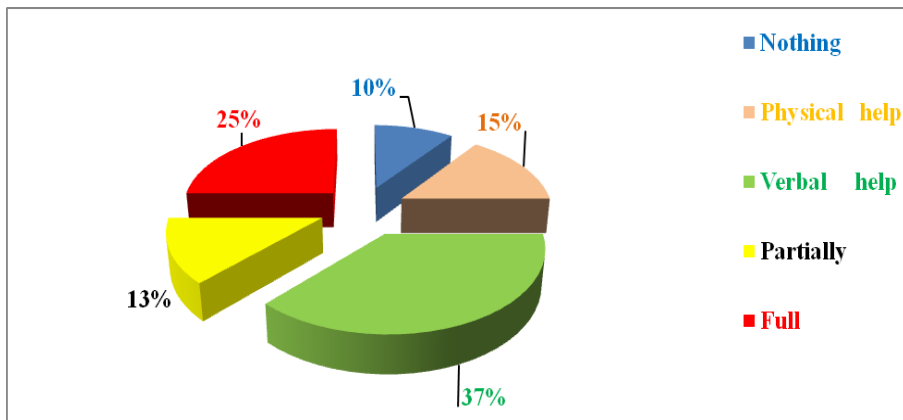
Figure 1 shows that autistic children treated with PEI, managed to achieve 37% of the sections of the Cognitive Development Program at the level of Verbal Assistance and 25% of the sections to complete them.

Figure No.2. Language Proficiency.
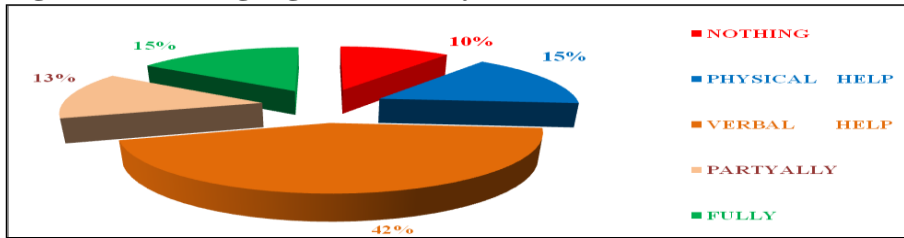
In Graph no. 3, autistic children manage to complete 42% of the rubrics at the level of verbal assistance, 15% of the rubrics are completed with physical assistance and 15% of the rubrics at the full level.

Figura.Nr. 3. Socializing Behaviors
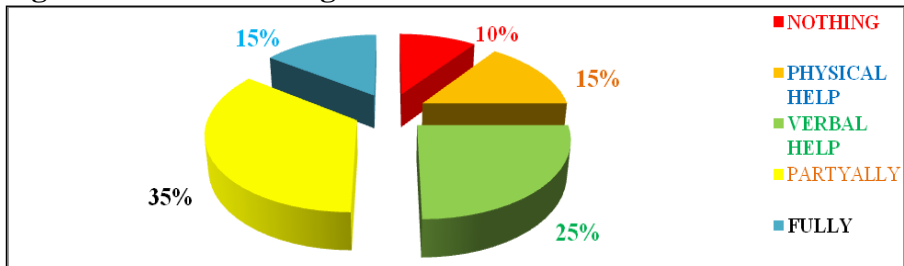
IN Graph no. 3 shows that autistic children complete 35% of the rubrics at the partial level, 25% of the rubrics are completed with verbal help.
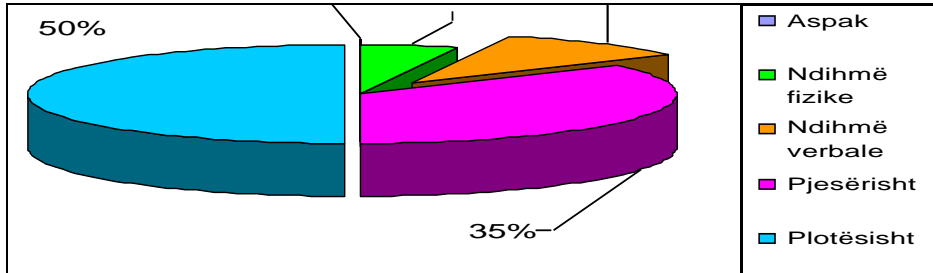
Case study:

The results are as follows:
Children treated with educational rehabilitation programs.
Graphic representation of the mental age of O.O In the year-2018-2.5 years; 2020.6.5vjec
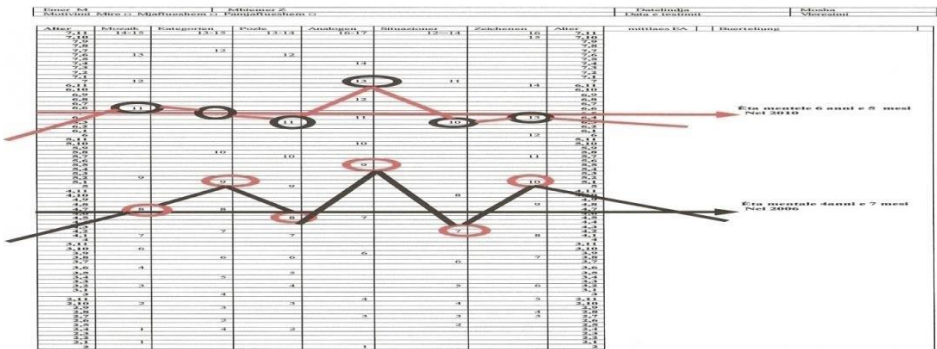
Child O.O. Cognitive training

Not at all.0%. Physical assistance.5% .Verbal assistance.10% Pjesërisht.35%Plotësisht.50%.

Child O.O.Language training

Aspak. 0% .Physical assistance5% .Verbal assistance 5%. Partly 55 Fully 30%
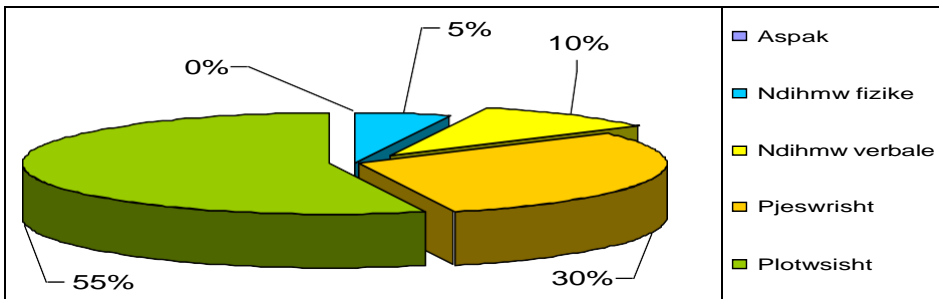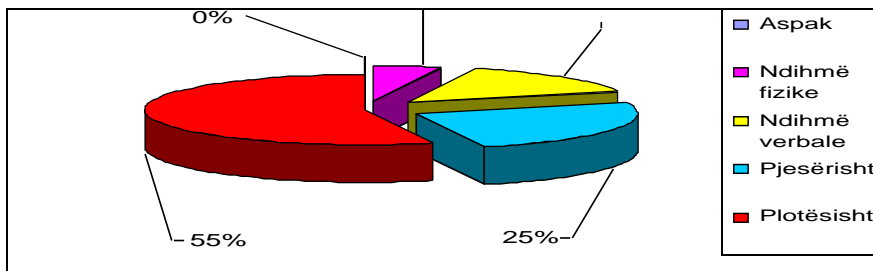

Graphic representation of the mental age of S.S. In the year-2018-2.5 years; 2020.6.3vjeç
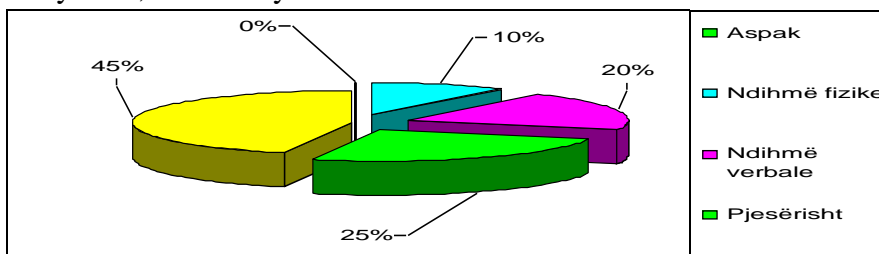
S. S. Cognitive training.

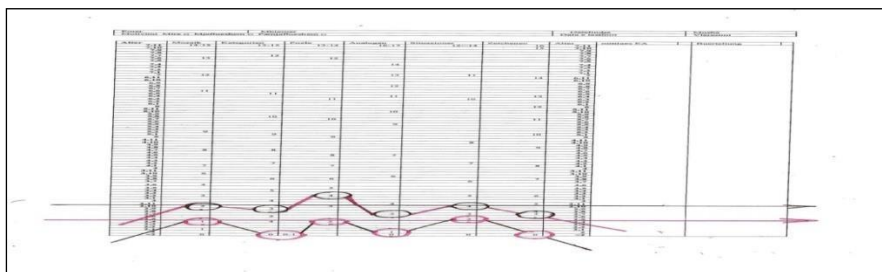Not at all 0%, Physical help10%, Verbal help20%.
Partly 25%, Fully 55%
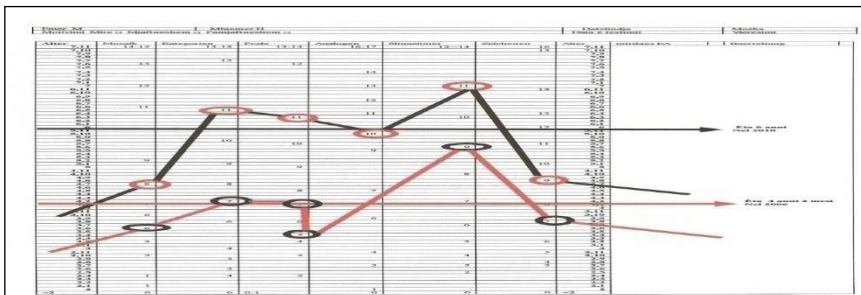
S.S.Language training.
Not at all 0%, Physical help 5%, Verbal help15%,
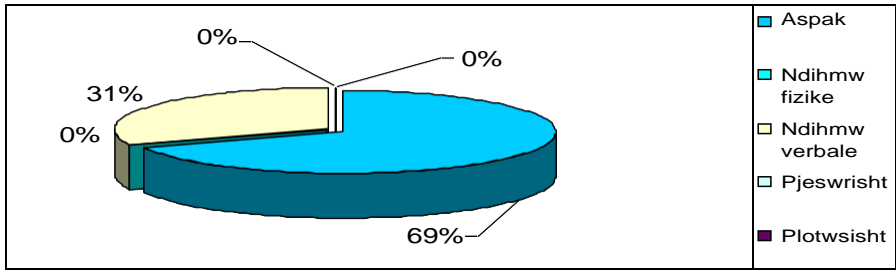Partly 25%, 45% Fully

Children not exercising with Individual Education Programs (PEI)
Graphic representation of I.L. mental age; In 2018 - 2.5 years old;
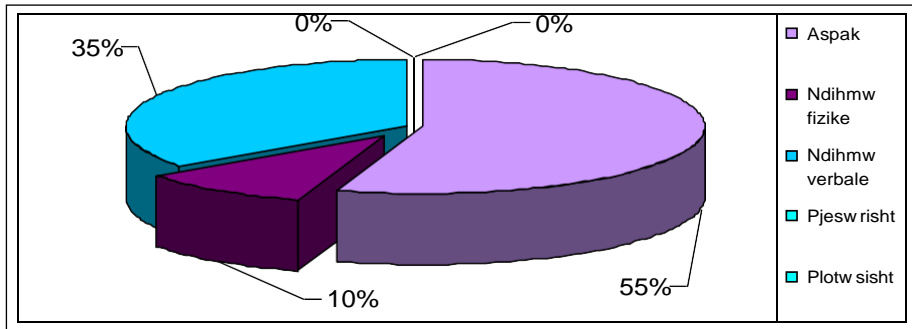2020- 3.1 years;

I.L.Cognitive training.
Not at all 69%, Physical help31%, Verbal help0%.
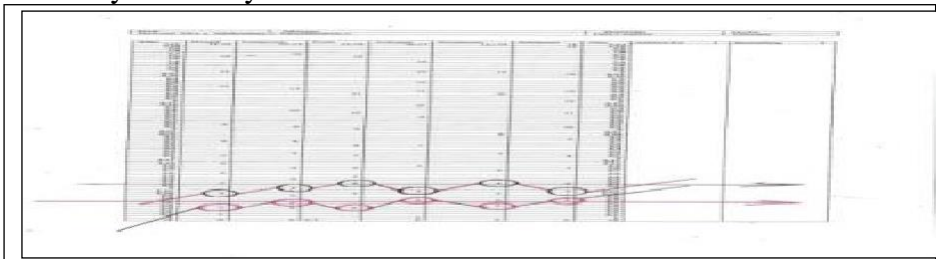Partly 0% .Fully 0%.

I.L. Language training
Not at all.55%, Physical Assistance35% .Verbal Assistance0%
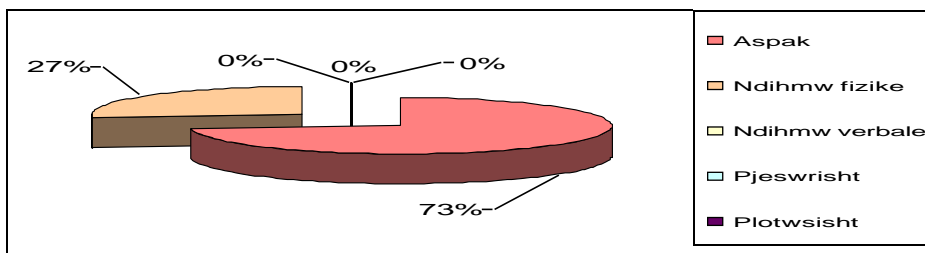 Partially 0% .Fully 0%

I.L. Language training
Not at all.55%, Physical Assistance35% .Verbal Assistance0%.
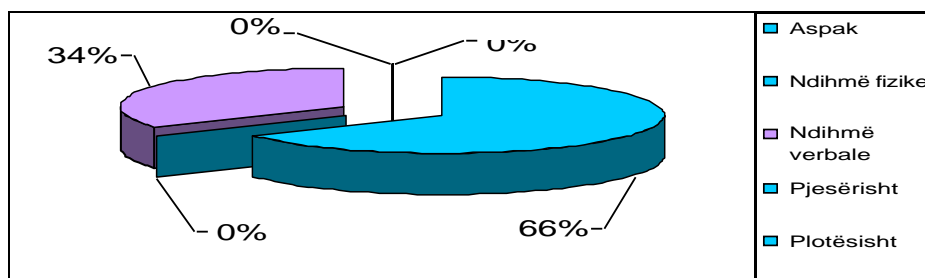Partially 0% .Fully 0%

E.A. Cognitive training.
Aspak73%, Physical assistance27%, Verbal assistance0%.Partially
0% .Fully 0%

E.A. Language training
Not at all 66%, Physical help34%. Verbal help.0%
Partly. 0%, Completely

Conclusions
• A database with epidemiological data is missing. Lack of timely diagnosis of children with autism spectrum disorders.
• Identify disorders with the Denver screening test for ages 0-6.5, and elements of the autism spectrum at an early age.
• Diagnosis of the disorder referred to the international classification system according to DSM-4 and DSM-5, after May 2013 to be done through various sources of information, structured and standardized questionnaire for parents, doctors, with diagnostic tests for the disorder and gravity of ADOS.
• Diagnosis should be made by multidisciplinary teams trained by psychiatrists, psychologists.
• Therapeutic interventions to be developed as early as possible, individual, long-term with (PEI)
• Integrate autistic children into preschool psychoeducational structures, and normal academic structures in inclusive education

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Deborah Fein & Michel Dunn, (2007) .Autism in your class. Publishing house: Albanian Children Foundation "Domenick Scaglione" ILAR Printing House.Tirana.P.3.3-10; 12-26.
 Lynnan,Cohen Brennan.(2010) Shtëpia botuese:Fondacioni Fëmijët Shqiptarë "Domenick Scaglione" Shtypshkronja ILAR.Tiranë.Fq.22-35; 98-110; 120-142.
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Website:

http://www.amazon.com/Children-Autism-MichaelD.   Powers dp/1890627046

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(http://www.autisminternetmodules.org/)

http://www.google.com/#hl=en&source=hp&q=Autism+Diagnostics +Observation+Schedule&aq=f&aq=&oq=&fp=400a82fa82571428

BULLYING AND THE LOCUS OF CONTROL IN ADOLESCENTS

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Abstract
Bullying at school has become a worrying topic for society and much research has been done in different parts of the world in the last two - three decades. The overall purpose of this study is to identify bullying behaviors and locus of control as well as to examine the relationship between them. Methodology. This study investigated 50 adolescents aged 14 to 18 years. The study used a combination of observation and interview methods. Each participant was interviewed in the presence of a psychologist. The data were analyzed qualitatively and quantitatively. Results: 23% of study participants respond and the reason why they are bullied is that they look different from others and 43% of participants are bullied at school. The modes of harassment (physical and psychological) occupy approximate percentages which means that there is an alternation between the "bully" and the "bully". The "strength" of the bully is seen both in the physical aspect (they break my things 13%, they attack me 13%, they push me 10%, they play with me 5%) as well as in the psychological aspect, which if we group them are almost equal (41% to 59%). Conclusions: Bullying occurs in the vast majority of cases on school premises, where students spend most of their time with each other. Harassment is daily. In most cases they are performed by older people and with the status of "strong". The form of bullying is varied, but what stands out is that physical and psychological bullying are in equal proportions.
Keywords: Bullying, locus of control, adolescence, aggressor.

Introduction
Psychologists have defined a *bullying victim* as a person that is repeatedly and intentionally exposed to injury or discomfort by others, with the harassment potentially triggered by violent contact, insulting,

communicating private or inaccurate information and other unpleasant gestures like the exclusion from a group (Olweus, 1997). This explains why this aggressive behavior typically emerges in environments characterized by the imbalances of power and the needs for showing peer group status (Faris and Felmlee, 2011). Not surprisingly, schools are the perfect setting for bullying. The combination of peer pressure and diverse groups, together with a sense of self-control still not fully developed, makes schools a petri dish for its materialization.Bullying is very costly. It should not be considered a normal part of the typical social grouping that occurs throughout an individual's life (NAS, 2016). The fear of being bullied is associatedwithapproximately160,000childrenmissingschooleverydayintheUnitedStates (15% of those who do not show up to school every day);1 one out of ten students drops out or changes school because of bullying (Baron, 2016); homicide perpetrators are twice as likely as homicide victims to have been victims of bullying (Gunnison et al., 2016); suicidal thoughts are two to nine times more prevalent among bullying victims than among non-victims (Kim and Leventhal, 2008). *Locus of control* is an aptitude that to be relevant control in excess of outcomes. People considering themselves able to control their outcomes are known as internal or possessing internal Locus of control. Externals or individuals with external Locus of control considered their outcomes beyond of their control. Individual with internal locus of control have high motivation for achievement and low outer directedness. On the other side externals always keep trying to search out explanations for their failures. We may also refer internals as "self-control" or "self-determination*".*An internal locus of control is composed of dependent events mostly related to one's permanent characteristics. Three types of locus of control had been acknowledged. Foremost, internal locus of control reflects the trust that one has personage control in surplus of the proceedings to make possible happen. Succeeding, authoritative other locus of control is the conviction that proceedings are not resolute by one's own behavior, excluding by persons who are in positions of power over the human being. Third, unidentified locus of control is at what time a person does not acquainted with why actions take place (Doumas, Halloran, John & Margolin, 1999).

Objectives: The purpose of present study was to investigate the attitudes and perceptions of adolescence, relationship among locus of control and bullying behavior among adolescence. So, the present study will focus on these issues in adolescents as to investigate the role of locus of control, and bullying. By exploring these relationships this study may provide valuable information to school counselors, teachers, parents and for understanding bullying. Moreover, findings may help into planning appropriate prevention strategies for dealing with bullying.

Literature review

Bullying behavior is compared to school violence (Swearer, Espelage, Vaillancourt, & Hymel, 2010)because it is a form of unwanted aggressive behavior (Orpinas& Horne, 2006) and exist imbalance of power(Rigby, 2004)between bullies and victims. Bullying behavior appears in different types, such as, physical bullying (hitting, kicking, punching, tripping/pushing, taking of others belongings), verbal bullying (teasing, taunting, inappropriate sexual comments, threatening to cause harm, telephone bullying), social exclusion (spreading rumors about another person, purposely leaving someone out of an activity or group or embarrassing a person in public) and indirect bullying (spreading nasty rumors, telling others not to play with someone, deliberate exclusion) (Atik, 2006).

To understand the nature and extent of bullying a number of studies were conducted. One of the first studies exploring students' perceptions towards bullying was conducted by Olweus (1978), which found that rather than being bullied due to prototypical "nerd" or social-out cast characteristics(e.g., wore glasses, different clothing, spoke differently, overweight, etc.), students were bullied because they appeared physically and/or emotionally weak.

Rigby and Slee (1991) found that the majority of Australian children were opposed to bullying and tended to support the victims; however, the children's attitudes toward victims became less supportive as they became older. Specifically, they tended to dislike victims of bullying and admire the bullies.Bartini (2000), note that the increase in bullying behavior occurs when students make the transition into middle school. Thus, bullying behaviors appear to reflect the needs of students to establish social status as they transition in to a new peer group. In

addition to transitioning into new peer groups, early adolescence is also a time when cross-sex contacts and interactions become an important goal.According to researchers (Modecki, Minchin, Harbaugh, Guerra, &Runions, 2014),a meta-analysis of 80 studies analyzing involving of bullying rates for 12-18-year-old students reported 35% were involve in traditional bullying and 15% involve in cyberbullying. Research findings shown bullying behavior is increase among students and is a problem in schools and countries around the world.

Students who are engage in bullying behavior are at greater risk for both mental health and behavior problems than students who only bully or are only bullied (Haynie et al., 2001). Bullying damages students' academic progress through the falling of grades (Dake et al., 2003). The National Institute of Child Health and Development, reported that children who are involve in bullying behaviors were at high risk for engaged in future violence related behaviors. They have a risk for academic problems, substance use, and violence later in adolescence and adulthood (Farrington & Baldry, 2010) compared to adolescent who only bully, or who are only victims. Different factors can increase adolescent risk of engaging in or experiencing bullying. Some of the factors associated with a higher to engage in bullying include poor peer relationships, low self-esteem (Kapçı, 2004), perceived by peers as different or quiet (Marini, Dane, Bosacki, &Cura, 2006), loneliness, academic achievement (Pekel, 2004) locus of control (Österman et al., 1999).

The locus of control idea is based on what psychologists call social learning theory. Social learning theory suggests that an expectation is reinforced (Mackey,2003) when the expected events or behavior actually occur in the future (Rotter,1966). In other words, if you expect something to happen and it does, your expectation is reinforced, and if your expectation does not occur, your expectation is weakened. Rotter proposed that whether or not one believes they have control over the causes of reinforcement determines the outcome. This is like the "self-fulfilling prophecy" concept you may have heard about (Merton, 1968). Essentially Rotter's definition of "control" includes anything that you have power over. He postulated that individuals who believe that their own behavior or characteristics determine or cause events possess an internal locus of control. On the other hand, people who think that reinforcement following an action is not entirely contingent

upon their own actions but instead perceived as luck, fate, chance, or other forces beyond their control have an external locus of control.Very little research has been conducted to find out the relationship of locus of control with bullying behaviors. For example, Österman et al. (1999) were found significant correlation with all three types of (physical, verbal, and indirect) bullying behavior with external locus of control. Slee (1995) found victimize children have external locus of control. On the contrary, Andreou (2000) found, children who are both bullies and victims may be characterized as low internal locus of control belief. So, in regard of self-esteem and locus of control conflictual result was found in both cases of bullies and victims. But it said that bullying behavior is associated with selfesteem and locus of control.

Methodology
Research Design and Participants
In this research survey design was used to collect research data. In this research data was collected from participants by questionnaire. To conduct this research the data were collected from 50 pupils. Their age range was 14 to 18 years old (M = 12.34; SD = .54; n = 50).
Instrument
For data collection the consent form, demographic information form, The Bully Survey, Rotter control locus questionnaire were used.

1.Consent form. Participant have to provide signature if he/she fill up the questionnaire by knowing all the aspects of the study. 2. Demographic information form. Demographic information sheet containing some personal information which was attached with questionnaire. It included information about participant age, sex, economic status, educational qualification (grade). 3. The Bully Survey (Swearer, 2001). 31-question survey that queries students regarding their experiences with bullying, perceptions of bullying, and attitudes toward bullying. 4. *Locus of Control Instrument of Rotter* is a 29-question tool to measure the degree to which individuals believe they have the ability to control what happens to them (internal) or how much they think that forces beyond their control affect their situation (external).In data analysis all participants were divided into three groups depending on the points accumulated during the application of the questionnaire on the control locus. Individuals who accumulated high scores during the analysis of the questionnaire in relation to the

set average were labeled as individuals with external control locus. While individuals who accumulated low points in relation to this average were labeled as individuals with internal control locus.

Procedure
The questionnaire was administered to each of the 50 respondents individually, rapport was established through conversation with each of them. Then provide a combination of two questionnaire of locus of control scaleand bullying behavior scale. Participants were assured that their information will be kept completely confidential and will be used only for research purpose. After collecting the data the researcher gave thanks to the participants.

Result and discussion
Results will be described in terms of examining perceptions and attitudes toward bullying among bullies, victims, bully-victims, and no status students and kind of locus contol of them across their high school years.
Students' experiences with bullying and victimization across their high school years were examined. Specifically, perceptions regarding the top locations where bullying was reported, the form of bullying, who was involved in the bullying, how students felt the school responded to the bullying, and participants' attitudes toward bullying are presented.

Main Locations Where Bullying Occurred
Themajorityofstudents acrossthestatus groups reported that bullying occurred most frequently in classrooms 41%, hallways17%,afterschool 19%andgym16%orrecess 7%.
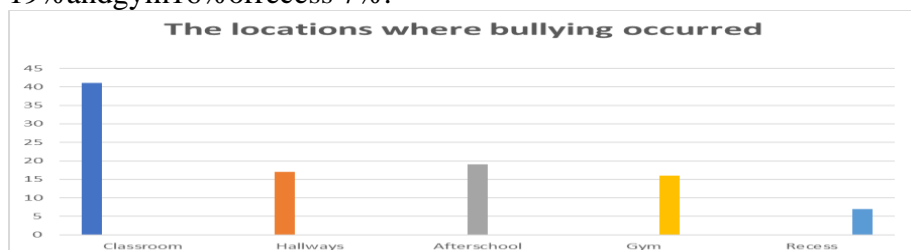
**Graph 1. The locations where bullying occurred**

Perceptions of Bullying

Students' perceptions of why they were bullied or why they bullied others were examined across 14 -18 years old. Interestingly, there was some consistency across status groups concerning students' perceptions of why the bullying behaviors occurred. External attributes such as being different, being weak and wearing certain clothes were cited across all four status groups as reasons for bullying.

Who was involved in bullying incidents?
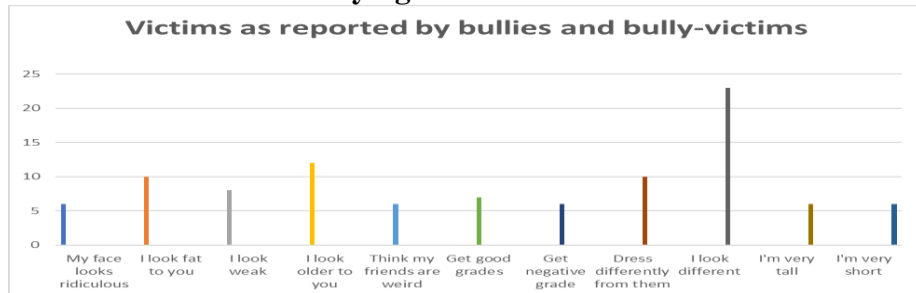
**Graph2. Victims as reported by bullies and bully-victims**

Victims endorsed getting good grades, being weak 4%, overweight 9%, different, and wearing certain clothes as reasons for being bullied. My face looks ridiculous 6%; I look fat to you10%; I look weak8%; I look older to you12%; think my friends are weird 6%; get good grades 7%; get negative grade 6%; dress differently from them 10%; look different 23%; I'm very tall 6%; I'm very short 6%.
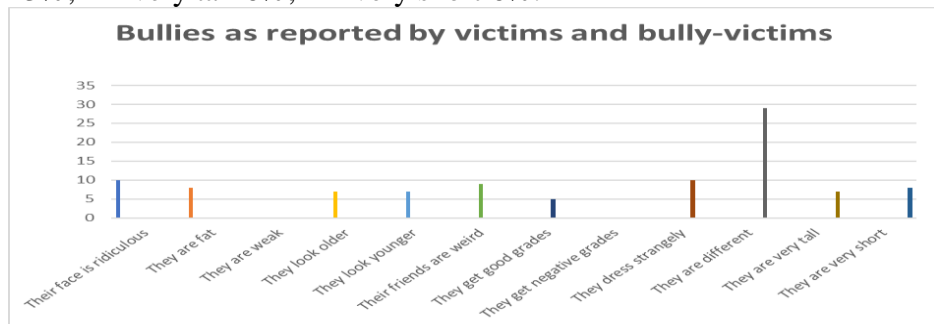
**Graph 3. Bullies as Reported by Victims, Bully-Victims**

Bullies endorsed perceived physical attributes such as the way someone talks, the clothes they wear or being weak as reasons for bullying etc. Their face is ridiculous10%; they are fat 8%; they are weak 0%; they look older   7%; they look younger 7% their friends are weird 9%; they get good grades 5%; they get negative grades 0%;

they dress strangely10%; they are different 29%; they are very tall 7%; they are very short 8%.
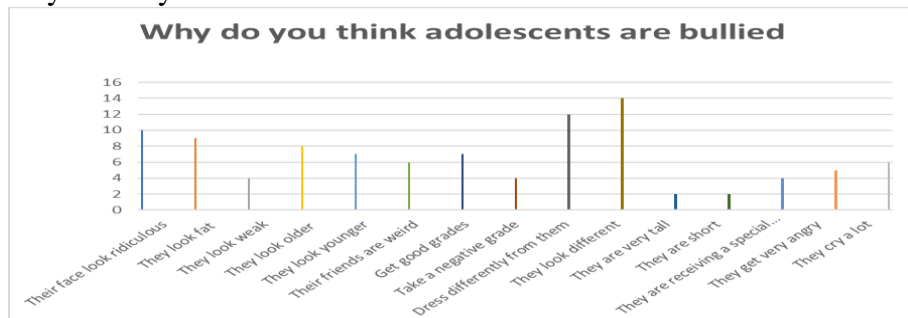
Graph 4. Victims as reported by no-status adolescents
No-status students endorsed being weak, overweight, different, and wearing certain clothes as reasons for students being bullied etc. Their face look ridiculous10%; they look fat 9%;they look weak 4%; they look older 8%; they look younger 7%; their friends are weird6%; get good grades7%;take a negative grade4%; dress differently from them12%; they look different14%; they are very tall2%; they are short2%; they are receiving a special education4%; they get very angry5% **;** they cry a lot 6%.
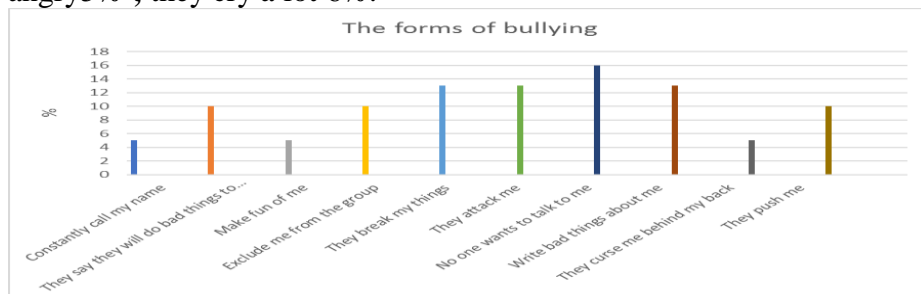
Graph 5. The forms of bullying
Constantly call my name 5%; they say they will do bad things to me 10%; make fun of me 5%; exclude me from the group 10%; they break my things13%; they attack me13%; no one wants to talk to me16%;Write bad things about me13%; they curse me behind my back 5%; they push me 10%.
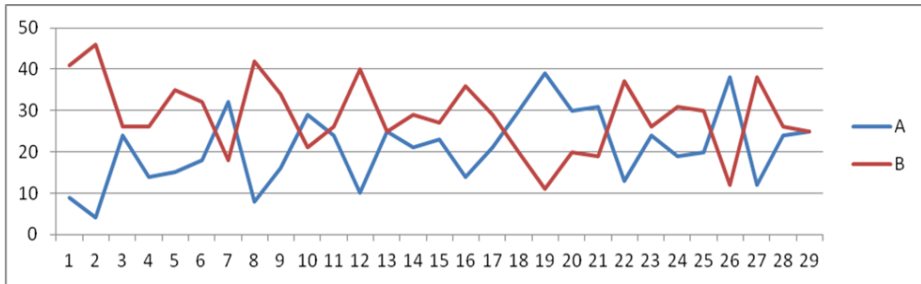
Graph.6 Locus control of girls

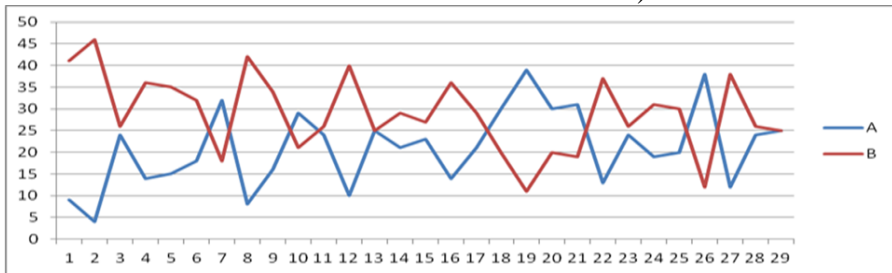As can be seen from the graph 6, girls are more inclined in their answers towards the internal locus of control (out of 29 questions, only 6 tend towards the external locus of control, 3 answers are almost equal and the other 20 answers confirm what we said above).

Graph.7Locus control of boys

Even in men, as seen from graph 7, in their answers in their answers they are inclined towards the internal locus of control (out of 29 questions, only 6 questions tend towards the external locus of control, 3 questions are almost equal and 20 others confirm what we said above).

Specifically, there were no differences in terms of gender acrossbullies, victims, bully-victims, and no-status groups.When one considers our use of the definition of bullying that includes both verbaland physical behaviors, this finding is consistent with previous researchthat has found that girls and boys are equally involved in bullying when bullying includes both overt and covert behaviors (Ahmad&Smith,1994;Boulton&Smith,1994;Hooveretal.,1992) and that pupils include both verbal and physical aggression in their definition of bullying (Espelage&Asidao, 2001).

When asked about the location of bullying incidents, most participants reported that they were bullied in more than one location in and around the school building. Bullying was reported to occur most frequently in

hallways, classrooms, gym and/or recess, and after school. This is consistent with previous research that has found bullying occurs in those same locations (Limber & Small, 2000). This finding has implications for program development, as school scan implement interventions such as increasing the number of hall monitors, monitoring the school grounds, and adopting teacher training programs that help teachers identify bullying behaviors.

The forms of harassment (physical and psychological) in the questionnaire occupy approximate percentages, which means that there is an alternation between the "bully" and the "victim". bullies- victims". The "strength" of the bully is seen both in the physical aspect (they break my things 13%, they attack me 13%, they push me 10%, they play with me 5%) as well as in the psychological aspect (other questions), which we are grouping are almost equal (41% to 59%).

Regarding the locus of control in girls and boys (victims of bullying), from the graph we see that in the vast majority of responses, this category of girls and boys has an internal locus of control. They see flaws in their physique, in their abilities and misfortunes, in their vices, and so on. Only 6% of respondents have an external locus of control (I think my friends are weird).It is enough to look at the percentages and come to the conclusion that they see the justification for their bullying in the characteristics of other people they abuse. Even girls and boys (who may or may not be bullies or victims of bullying, no status) have an external locus of control over the phenomenon of bullying by looking at it from the outside; they see everything in their bullying friends.

Results revealed that lower scores in internal locus of control index or external locus of control increase the likelihood involvement in bullying for adolescents. This finding is in line with other research findings (Andreou, 2000; Österman et al., 1999; Rigby & Cox, 1996) indicated bullying behavior is negatively related to internal locus of control, that is children who are involved in bullying have external locus of control. These findings can be explained by the following way: individuals with an external locus of control believes that negative outcomes will occur and he does not have control over surroundings (Breet, Myburgh, &Poggenpoel, 2010). These beliefs often lead to feelings of anger, frustration and aggression (Österman et al., 1999; Perlow& Latham, 1993). So, Individuals with an external locus of

control can't manage stressful situations effectively by using problem-solving strategies (Storms & Spector, 1987). It leads to poor coping mechanisms in social situations, they have poorer interpersonal relationships (Marini et al., 2006; Österman et al., 1999; Slee, 1995)including aggressive behavior as bullying behavior (Österman et al., 1999).

Conclusion and recommendations
 children with bullying can change their problematic behavior when adequate supports provide. After completing this study, it was suggested that or behavior management techniques would be helpful to boost their self-concept as well as changing unwanted behavior of children who are involve in bullying. To do this the school community can planning school conference days on bullying issues, providing belter supervision at recess, forming a bullying prevention coordinating group, encouraging parent-teacher meetings, establishing classroom rules against bullying, holding classroom meetings about bullying, requiring talks with the bullies and victims, and scheduling talks with the parents of involved students.

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SOCIAL SCIENCES
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CYBER CULTURE: HUMAN RELATIONS IN THE NEW AGE OF COMMUNICATION

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Abstract
The mode of communication determines the nature of the human relationship. Scientific and technological development changed the forms of communication and consequently today it begins for another social culture. Earlier the individual had a concrete, more material experience. Today, thought, technical science and especially media and information technology have surpassed this reality. This transcendence has fundamentally changed the way we think, act and all our way of life. It is in this paper that we will stop to recognize this difference, judging communication and human relationships in a symbiotic sense. Postmodern discourse sees this relationship as a matter of actuality when talking about a posttechnological society. Specifically, referring to this debate we will focus on cybernetic culture. We will first analyze the changes in psychosis, the worldview of the individual in relation to the world. In another aspect we will look at how interpersonal relationships are created in terms of cyber culture and hence to judge the changes that social culture has undergone in the macro context.
Undoubtedly, technological development improved human life, but it also created new challenges and problems. The main issues that arise are of an ethical nature. The discussion begins with the changes that man underwent in the existential sense. Interpersonal relationships themselves are in crisis due to the alienation of the human, the illusion of a simulated reality, the technicalization of life, which are a consequence of the new era of communication.
Keywords:*cyber culture, communication, interpersonal relationships, simulated reality, life technicalization*

Transformations of the digital society

Culture refers to the different ways of knowledge, beliefs and codes of ethics that are consolidated in a society. So it has to do with the ways in which people create their symbols through which they organize and interact in society. The sum of symbols, values, customs, rules, objects and other social skills are qualities of human culture.

Culture is the information base of human society, a vital condition for its existence. As such, it is inseparable from information. Within the cultural space, the aspect of spiritual culture is usually identified with influence in daily life. This dimension of culture includes religion, art and philosophy. A characteristic feature of all forms of spiritual culture is that they have a combination of knowledge and values. Hence the norms and rules of conduct that determine behavior and relationships with others in society. This means that culture determines the forms of communication and manner determines the nature of the human relationship.

Scientific and technological development changed the forms of communication and consequently today it begins for another culture, cyber culture. Earlier the individual had a concrete experience, but today, technology and especially media and information technology have surpassed this reality. This transcendence has fundamentally changed the way we think, act and all our way of life. In addition to social and spiritual culture, cyber culture has an inherent influence today, almost like a new social reality not previously known. The issue is ontological, existential and cultural too topical to get a discussion.

The Internet and digital communications (WWW) have become widespread and this change in communication has transformed the human experience. Already, we can say without hesitation that man has been immersed in a new reality, which is markedly different from that ordinary reality lived for thousands of years.

However, although cyberspace cannot replace concrete reality, it is noted that the most important change is related to the replacement of the traditional concept of the human being as a separate entity. Man, situated in this virtual world, has created a new ontological self-perception, already as an information entity interconnected with the whole world.

Undoubtedly technological development has improved human life; has facilitated communication, has created more convenience, gives more time, creates opportunities for countless forms of information and knowledge. However, the development of communication technology is making unthinkable advances, where more and more tools are being personalized. The question that arises here is: "What does it mean to be human in a virtually interconnected world?" (Levi &Mamlok, 2021, p. 2). Man and society are in the conditions of a massive networking (hyperlink) of information and communication that has followed with metamorphoses in the consciousness of everyone and the social culture as a whole.

Determining the essence of a digital reality requires that we recognize the fundamental transformations of the human experience. The most important are:

a. Ambiguity (confusion) of the difference between reality and virtuality

The duality of reality - virtuality begins with the early philosophical debate, that cognition comes from the senses or from reason. The classical dichotomy in this discussion remains the allegory of Plato's cave. According to him, the senses lie to us, do not represent the real world and it is the mind, the soul that discovers and knows the truth (Hersh, 2000, pp. 27 - 28). The difference between reality and virtuality in different historical epochs reflected social norms, values and beliefs. Virtual communication has changed perceptions of physical reality. The blurring of the distinction between reality and virtuality is obvious. More than reality, today we live in a world of mirages that are believed to be true and on this belief relationships are built. But more and more in everyday situations, it becomes difficult to identify the difference between reality and virtuality. It can even be argued that there is no reason to limit our worldviews to these two possibilities. The ambiguity of the distinction between reality and virtuality as a result of digital transformation compromises our dualistic forms (Levi &Mamlok, 2021, p. 4).

b. The ambiguity of the difference between man, machine and nature

For most of human history, distinguishing objects from nature was relatively uncomplicated. Based on significant scientific advances in medicine, biotechnology, digital communication, etc., it is being

noticed that people and technology are becoming more and more connected. The connection has gone so far as to blur the distinction between people and objects.

c.   *From lack to abundance of information*

The third transformation refers to the abundance of information (data), which drastically distinguishes the digital society from the previous one. Before digital technology encyclopedic impossibility represented the omnipotence of knowledge. This premise of encyclopedic utopia is that knowledge serves as a normative compass, which guides individuals and societies. The more we know, the better we act. On the contrary, mistakes and wrong behaviors, according to this thesis, are associated with lack of knowledge. Today it is not this problem, the lack of knowledge or information, but our ability and interest in a certain knowledge.

Cyber culture: A new ontological self-perception

Clifford Geertz considers culture to be a human-woven fabric. Metaphorically man is a kind of spider hanging on the web of meanings that he himself has woven. To travel through the threads toward the center of the net, one outside of this fabric must discover the common interpretations that hold this net together, from which stable and long-term patterns and behaviors are created (Levi &Mamlok, 2021, p. 2). This understanding of culture in social space can be seen as parallel (analogous) to cyberspace, but with one difference, it lacks face-to-face interaction, extremely important in communication and human experience.

The social interaction approach distinguishes forms of communication based on how close they are to the face-to-face model. Digital communication is more interactive and creates the impression of personalized communication. One of the most famous advocates of this view is Pierre Lévy with his book 'Cyberculture'. Levi sees the world as a "global wide web" (WorldWideWeb), as an open, flexible, dynamic information reality that enables human beings to develop a new, more engaging and interactive orientation towards knowledge. The Internet offers virtual meeting places that expand social reality, expand opportunities for knowledge acquisition and exchange of perspectives. Of course digital communication does not offer full face-to-face interaction, but it does provide new forms of interaction that

enable personal contacts, which is not possible in traditional communication.

Of course, this new space in addition to the advantages also has disadvantages. True they are open and flexible, but they can lead to chaos and confusion. Man in cyberspace has to orient himself to the infinite abundance of information. So how to 'survive' in a 'sea' of information, where the sea is not 'clean' because it involves manipulated data, information and knowledge from unreliable sources. Beyond this fact, digital communication expands the possibilities of choice, but this is not necessarily a good one, as man needs structuring and orientation.

Digital technology just as it gives you access to information so it keeps information confidential about the individual. Digital devices in use leave traces of our actions such as: coordinates, interests, tastes, purchases, beliefs, etc. The scale of such information is growing exponentially globally. This kind of confidential information dominates people's lives, where data flows are becoming the ontological basis of the surrounding reality (Levi &Mamlok, 2021, p. 5). To this fact, Erik Fromi would see a disturbing irony, because man-made tools are becoming masters, controllers of their lives, "*... technology is a new God*" - he writes (From, 2011, p. 42). The interaction of almost every human experience is mediated through a sophisticated 'shell' connected to personal data. Within this virtual shell the person orients his thoughts, work and daily life. Because of these changes, human conditions and human relationships are changing fundamentally. If once man was afraid of becoming a slave, today is the risk for his robotization.

Pier Levy would see it as a ritual human relationship with technological means of communication. This type of communication is seen as a means not only for personal interests, but they create opportunities to be close to each other in the form of a community and offer us a sense of belonging. We do not interact so much with people as with the channel (medium) itself, so we do not use it to tell us something, but as a ritual that makes sense in itself. This ritual makes us feel part of something bigger than ourselves. In fact there is a high level of interaction, but not with the person in front, but with the computer or the phone. Communication in the digital age creates computer simulation of a person's presence.

Jean Bodilard believes that signs are increasingly detached from the objects they present and that the media and even more so the digital development of communication have set in motion this process bringing it to a point where nothing is more real. Previously, the sign had a clear connection to the object, was its representative. Today, according to Bodilard we are in the age of simulation, in which signs no longer represent reality, but create it. Simulation determines who we are and what we do. Man no longer uses tools to represent his experiences: signs create him. Objects have been separated, removed from their natural state, and have acquired completely strange meanings to man. We are constantly blurred to distinguish the real from the virtual.

This model of communication for many of them (Horkheimer, Adorno, Markuse, From, Stiegler, Bidilard, etc.), is seen as a form of human decay and degeneration. Rapid and shallow communication has trivialized culture, the spread of misinformation jeopardizes hermeneutic knowledge, depletes the ability to reflect on experiences, puts social solidarity in crisis. Shallow thinking motivates manipulation, illusion and simulated reality, where it massively creates a culture of consumption and socio-political control. Simulated reality suggests our desires, what we want - shapes our tastes, choices, preferences or needs. Consumption gains value in itself. It no longer matters what we consume or what our needs are, it matters what we consume. The supply demand ratio is distorted in favor of supply, which comes before the needs of the customer are articulated. On these arguments, "*Stiegler describes digital technology as 'pharmakon', a Greek term understood as poison*" (Levi &Mamlok, 2021, p. 2).

The integration of cyber culture into social culture as a whole has transformed the human experience as a result of changing the way we communicate. It is precisely the lack of direct contact, the unknown in communication, the excess of information that has transformed our understanding of ourselves, of others and of the world. The discourse today is precisely the recognition of this ontological shift.

As such, our new ontological model can be portrayed, at least to some extent, as information entities. A new ontological state is described by the "permanent presence on the network" (hyperlink) compared to the interconnections of people in the paradigm. In addition, the concept of space and time has changed.Today one can work, communicate,

consume and direct many other actions from almost any place on the globe.

"*According to William Mittchell, the spread of the internet and virtuality has affected how people understand their identity. He suggests that the separation between man and machine is no longer valid. They are practically uniting with the human being on a biological level*"(Levi &Mamlok, 2021, p. 3). This symbiosis means not seeing the difference between 'technical humanization' and 'human technicalization'. Today we are talking about a new notion of the meaning of identity, quite different from the traditional one. Cyberspace has reshaped the ontological state of humans and can be understood as a virtually interconnected (networked) consciousness. Inevitably, these changes reshaped the way man creates self-concept, the way they interact with each other, with the environment, public space, and so on.

This is a new world. The focus is now on how people consider their transition from the digitized world to changing self-concept and how they engage with others. As a result, culture, which can be defined as the '*second nature*' of man, has reached a new level and created a new layer in the form of interactive virtual space. In a digital society, a person not only creates a new objective world, but creates objects of a different (virtual) nature. For this reason, some scholars tend to consider cyber culture as a '*third nature*' (Levi &Mamlok, 2021, p. 4).

- **Virtual identity, hyper - personalism and de-contextualized reality**

The ease of access to innumerable types of information (e.g., news, literature, music, scientific knowledge) has changed the nature of human experience - the ability of any person (with internet access) to choose their desired content. This gives us new ways in which people build their worldviews, their relationships with each other and their understanding. Virtuality is fading the spiritual world and it is often difficult to distinguish a person's unique and free creativity from the composition of virtuality in his subject.

Spiritual culture in a networked world (hyperlink) is individualized and can be claimed as decontextualized. Social culture in a hyper-connected (over-networked) world consists of predispositions and self-perceptions or deeply individualized, highly personalized, intimate

identities, within a micro world . For many scholars, this is an opportunity for each person to express their uniqueness, which is suppressed by social culture. "*Individualization can be considered as the main movement that characterizes spiritual culture in the digital age*" (Levi &Mamlok, 2021, p. 9) .

The abundance of information unfiltered in the conditions of the multitude of micro world could lead the society to deeply relativized situations, which in the macrosocial sense leads to decontextualization. Hyper-personalization poses a problem for traditional cultural and social structures, such as the education system, which is based on standardized practices and unifies teaching-learning.

A human being forms the virtual personality and involves complex interactions with different personalities (persons) and communities. A virtual personality is significantly different from the real one. "*Specifically, 'real personality' in her comprehensive study, Sherry Turkle shows how the freedom to create your character on social media plays a major role in the lives of young people and from there radically changes human relationships. She claims that while self-presentation always involves a degree of conflict, self-presentation in digital time is always mediated through social media, which minimizes this psychosocial tension in the interactive processes in concrete situations*"(Levi &Mamlok, 2021, p. 8).

Very early philosophy with Socrates raised the problem of identity; "*Man knows himself*" (Hersh, 2000, p. 19) and so human thought asked: "who am I", "what is a human being? Today in the conditions of cyber culture, where identities are motivated to be personalized, more and more, the concern is how a person presents himself virtually. Digital communication characterizes a style of behavior of an individual in the network, which allows the person to form and display his identity differently from what it is in reality. Then we are in a state of duality of identity and personality. Personality is something a person develops through his life experiences. In conditions when the real and the virtual are not clearly distinguished, ie diffuse each other, then cyberspace is significant for the formation of identity.

Effective communication between people requires quick response to any networking event. In such communication it means living in a hyper-intense society. The rationality of the network society gives the idea that effective communication cannot be achieved if it is not with

the constant of activity across the network. The social character of the network conflicts with the hierarchical patterns of communication, where the principles of status and oppression dominate. The network converts the interaction between its users into an open free communication that challenges the traditional forms of communication in a society.

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THE IMPACT OF COVID-19 ON THE ACTIVITIES OF CIVIL SOCIETY ORGANIZATIONS IN ALBANIA

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Abstract
Since COVID-19 emerged, it has crucially influenced and has been influenced by health and public affairs in many countries of the World. Health system, economy, education, democracy, media, conspiracy theories, culture, tourism, Civil Society, welfare system are all sectors affected by the pandemic crisis due to the necessary measures of social distancing applied by governments.
Among them are the Civil Society Organizations (CSO), the performance of which is influenced by a number of features and steps, such as the restrictions of CSO staff movement, the fulfillment of activities and field researches, the loss of funding and the reorientation of their operations.
The main aim of this paper is to develop a more comprehensive and analytical thought about the impact of COVID-19 on Albanian Civil Society Organizations. We seek to provide a clear understanding of the situation due to the methodology of the present research based on a representative sample of 32 CSO all over Albania. The detailed answers of the questionnaire and the conclusions that will be drawn in this paper will help not only help understanding CSO's in Albania during the pandemic, but also the questions of democracy and political culture in regard with the overall impact of COVID-19.
Keywords: conspiracy theories, cyber-democracy, international partners, pandemic measures

Introduction

Since COVID-19 emerged, it has crucially influenced and has been influenced by health and public affairs in many countries of the World. Health system, economy, education, democracy, media, conspiracy theories, culture, tourism, Civil Society, welfare system are all sectors affected by the pandemic crisis due to the necessary measures of social distancing applied by governments.

Among them is the Civil Society Organizations (CSO), the performance of which is shaped by a number of features and steps, such as the restrictions of CSO staff movement, the fulfillment of activities and field researches, the loss of funding and the reorientation of their operations. This is at least, what happened with African CSO in 2020, investigated by Epic Africa Creating Agency and African NGOs (EpicAfrica and AfricanNGOs, 2020).

Based on the preliminary works, this study's aim is to develop a more comprehensive and analytical thought about the impact of COVID-19 on Albanian Civil Society Organizations. Furthermore, we seek to provide a clear understanding of the situation and the usage of the resources mobilized by the Albanian government's Coronavirus measures regarding the operation of Civil Society Organizations.

The research methodology of this study is the based on a representative sample of Civil Society Organizations all over Albania. The larger number of organizations taking part in this study compared with the previous researches, as well as the large geographical distribution of the sample in all parts of the county, is the key factor we use to explain the overall impact of COVID-19 and the suggestions expressed by CSO representatives.

This article is organized as follows. Firstly, it provides the empirical and theoretical background on what is a civil society, and the Albanian Civil Society Organizations situation facing the Pandemic. Secondly, we explain the methodology used in the study. Thirdly, we discuss the impact of COVID-19 to the Albanian Civil Society Organizations' activity, the consequences, and the measures that the Albanian CSO's have taken to face the situation. And in conclusion, we discuss the implications of the COVID-19 pandemic, the current situation and the future of the Albanian CSO's.

1. Civil Society and Civil Society Organizations

There are many definitions of civil society. Commonly, civil society refers to the social organizations that occupy the space between the state and the household, enabling people to coordinate their resources, the management of those resources and activities (Layton, 2006, pp.11).

According to Senyo Adjobolosoo citing Hegel's point of view, the existence of civil society itself is representative of a space that modern subjectivity can emerge. Furthermore, all the moral principles, norms and freedoms are defined within the connotation of liberty and within space. Thus, civil society is a sphere of recognition. (Adjobolosoo 2006, 59). As a result, following Hegel's way of thinking, civil society became increasingly linked with political participation and parliamentarism. (Bechelt, et al. 2014, 15). In other words, it promoted democracy as a combination of different social logics.

In addition, Ghanshyam Shah refers to civil society as an autonomous space, separated from society and the State's influence. That is possible, because civil society is an analytical site concerned mostly with the common good and the collective interests are primary and exert the most power. However, for Shah, the primary task for the civil society is to watch over the functions and behavior of the state and it has to respond or in worst case, take up arms if the state violates the liberty of the citizens, or imposes restrictions on individual autonomy. (Shah 2019, 15 & 18).

One, according to Alexis de Tocqueville, could enter voluntarily and freely into civil society, as long as one together with the others wants to pursue their interests collectively. Moreover, the organization that is a product of such cooperation is "non-state" and "non-profit", completely different from the market structure and the influence of the state. Thus, as a result, it makes civil society and its "successor" organization a "third sector". (Hunter, et. al. 2007, xii).

In continuation of Tocqueville's idea of civil society, the state and the civil society are two distinct spheres. The state, mostly referred to the government, is a sphere that is characterized by a set of norms, seldom private. However, the civil society's norms are exclusively private; it is a sphere of freedom for the individuals that decide to be part of it, to shape their ideas, to articulate their purpose of joining and to be part of

the internal structure of the civil society. Thus, civil society should be completely separated from the state.

As one can see from the definitions mentioned above, there exists a strong case of rejection of the idea that civil society should not work with the state and that civil society is different from the state. However, a question should be raised, whether civil society, its institutions and organizations should play a role in the state's politics and affairs. In order to differentiate between civil and political organizations, it is necessary to mention that Civil Society Organizations need to uphold a level of autonomy which will guarantee the good management of their plans and resources (Layton 2006, 16-17), and therefore, as a consequence, will ensure potentially the advancement of their members' interests and secure a channel of dialogue between the organizations and the state.

Historically, a Civil Society Organization was either supportive or were the opposition of the ruling government in a state by undermining the decisions and the unity of the state. The latter happened in Luansha, a mining town in Zambia, where a library association funded by foreign missionaries provided the local community with the momentum and resources to challenge the authority of the town's leaders and turn the town and the surrounding region into a "Welfare Society". (Layton, op. Cit.). In this example, the mentioned civil society organization surpassed the sphere of private affairs and it included in it the activities that were guided by solidarity. They were motivated by higher values, human rights, peace, and recognition of differences between the citizens albeit being social or economic ones, tolerance, etc.

However, the agenda of Civil Society Organizations trying to undermine the decisions of the state can and will bring new problems on the public agenda. By publicly denouncing the bad politics and policies made by the politicians, in a provocative and verbal manner, it will strip the objects of attack from any basic values. (Dvornik 2009, 112-113). Therefore, the extreme adversary stance of the CSO will in turn have a mirror effect on the desired outcome and it will, as a consequence, hamper their future work will be hampered. This was the case in the Yugoslavian state during the 80s and 90s. The ethnic communities there created fault lines which created new threats of the state breaking down that eventually the creation of the successor states and the dissolvement of Yugoslavia. (Layton, Ibid.).

In regard to Civil Society Organizations that are supportive of the ruling government, it is worthy to note that those CSOs are contracted by the state to carry out governmental functions or are engaged in activities in the trading activities associated with the private sphere. According to Jonathan Garton citing The United Nations System of National Accounts, the majority of the non-profit institutions (including CSOs) are likely to provide non-marketable goods or services to other institutions either for free or at an insignificant price. (Garton 2009, 21 & 32). Though, this does not mean that the CSOs don't receive funding on a collective or individual basis from various sources that include foreign investments in the form of a grant and private donations. It is necessary to note that a professional Civil Society Organization with a strong organization and capacity is the primary choice for the donors. Often, organizations that show nationalist tendency, veteran groups and other types that do not replicate the liberal and democratic practices are ignored and marginalized by donors and foreign investors. (Bechelt, Ibid., 153-154).

One of the most important functions and roles of the Civil Society and its Organizations are the facilitation of pluralism and the involvement of the citizens in the society. This function is, according to Jonathan Garton, the most attractive in regard to freedom to politically express (Garton, Ibid., 74). By providing groups that are considered minority or people without any representation, marginalized, an opportunity of representation of their interests, the CSOs enable them to play an active role in the civic and political affairs of the state, for example, the case of the mining town in Zambia mentioned earlier. The creation of many interest groups with diverse interests encourages the citizens to partake and become affiliates with not just one, but many different groups. In a manner of speaking, this means the discouragement of the polarization of interest groups with different ideologies.

Another important role of Civil Society is the facilitation of self-determination. There are many different ways that the Civil Society Organizations can contribute: i) by being an outlet of altruism, for example, a charity based CSO, focused on philanthropic ideals; ii) by being the means of mutual support, thus the desire to support its members, as an opposite of altruism; iii) by enabling ideological

expression, by providing platforms for ideological expression. (Garton, Ibid., 76).

2. Albanian CSOs and COVID-19

Like many countries, Albania was caught unprepared concerning COVID-19 and its challenges, while the pandemic remains the focal point of daily life and in the discourse among politicians, public opinion, media, and Civil Society actors. COVID-19 and its multilevel impact on Albanian society was investigated by Albanian researchers during the time of the pandemic. We could mention two of them.

In the first study, conducted by the Westminster Foundation for Democracy in November 2020, was examined the role played by civil society and media toward the crisis management in Albania, concretely the pandemic of COVID-19 and the consequences left by the powerful earthquake of November 2019. According to the research, the majority of CSO activities were postponed or carried out online, because of the anti-Covid measures applied by the Albanian government, although the latter failed to provide them essential financial support. The conclusions were based on the interviews conducted by the representatives of six CSO and seven interviewers from the media sector. (Bino, et al. 2020, 17, 70-79).

The second work is the Policy Brief of the Institute for Political Studies in Albania, published also in November 2020, where is emphasized the CSO capacity to adapt their operations into the new circumstances of social distance, by providing means of physical and online democratic surveillance. (Institute for Political Studies 2020, 3). Such was the campaign organized by the Albanian CSO "Alliance for the Protection of the Theatre" for 27 consecutive months against the demolition of the National Theatre building in Tirana. (Brahaj, et al. 2020).

According to research conducted in the Western Balkans about the impact of COVID-19 on CSO, it is shown that CSOs have contributed through civic activism in filling the gap of democratic deficiency left by governments during the pandemic. This was done by monitoring the transparency and accountability of governments' measures related to COVID-19, such as the restriction of movement or medical supplies, as well as the behavior that governments have demonstrated toward political opposition and Civil Society in their domestic political debate. In these circumstances, CSO has provided social support to

marginalized social groups, although not represented enough in consultations that governments might develop with social partners and actors. When it comes to anti-Covid action plans, CSOs have not received any financial help from governments in order to face the short-term problems dealing with the pandemic (Neshikj, et al. 2020).

3. Methodology

The study is based on a structured questionnaire in Albanian language, composed of 33 questions and organized in five chapters: I) General information about your organization - 6 questions, II) The impact of COVID-19 on the activity of your organization - 12 questions, III) More specific questions on the impact of COVID-19 on your organization - 2 questions, IV) Measures taken to face the situation – 11 questions, V) New opportunities – 2 questions.

The questionnaire was created in the platform Google Forms and sent online by us, through email to 35 CSO in different cities and regions of Albania. The sample of the survey is representative, not only with regard to the geographical and demographic distribution, but also according to the diversity of their scopes.

Furthermore, before sending the questionnaire by email, the authors of the research have contacted the representatives of the selected CSO with Skype and other means of telecommunication, where they have informed them about the survey. Data gathering and interpretation is applied carefully by all the authors, and the exchange of their views contributes to limiting any subjectiveness.

4. Data collection and interpretation: The impact of COVID-19 on CSOs

4.1. General information

We got responses from 32 organizations (out of 35 in total) in north, center and south part of Albania (more than 91% responded), which compose a representative sample, if we take into account the distribution of population in Albania.

The majority of CSO taken part in the present research are small Non-Governmental Organizations, whose organizational structure is based mainly in Tirana and in other large cities of the center part of Albania. These organizations cover multiple action areas and have rich

experiences of implemented projects, funded by national, European and international partners.

More concretely, 22 CSO or 68.8% of the total number of respondents have their headquarters in the center Albania, including the capital city of Tirana, together with Durrës and Elbasan, where is concentrated the majority part of the Albanian population, specifically 51.5% of the total population; 7 CSO or 21.9% of the respondents come from cities that belong to the south part of Albania, like Vlorë, Berat, Fier, Korçë, Gjirokastër, where lives 30.4% of the population; and finally, 3 CSO or 9.4% of the respondents come from regions of northern Albania, like Shkodër, Lezhë, Dibër, Kukës, which have 18.1% of the Albanian population (INSTAT, 2020).

The CSO were selected randomly according to the country's geographical regions from the official website of the Agency for the Support of Civil Society in Albania (Agjencia për Mbështetjen e Shoqërisë Civile - AMSHC).[1]

In the first question about the name of the organization, 31 of 32 respondents answered correctly, while one of them preferred to remain anonymous. In the case that someone would make any allegation about a potential fear of the anonymous respondent toward the government, the overall results show that this supposed fear is totally isolated.

In the second question about the type of the organization, more than a half of the respondents (53.1%) represent Non-Governmental Organizations, while the other half is divided into Think Tanks (15.6% of the respondents), Nonprofit organizations (12.5%), Civil Society Organizations (9.4%), Social organizations (3.1%) and Community based organizations (3.1%).

The CSO that took part in this survey cover multiple action areas, such as:

i) democracy, governance and the rule of law (43.8%)
ii) youth and youth policies (43.8%)
iii) economic development (43.8%)
iv) green policies and the environment (31.3%)
v) education (18.8%)
vi) human rights (18.8%)
vii) protection of children and persons with disabilities (18.8%)
viii) gender equality and women's rights (15.6%)
ix) security, radicalism and extremism (9.4%).

All CSO have small staff composed by 1 to maximum 25 employees, a fact that demonstrates about the nature of small-sized CSO prevailing in Albania. We had added on purpose three other alternatives about the number of staff that Albanian CSO may have, concretely ii) 25-50 people, iii) 50-75 people and iv) 75-100 people, but no one from the respondents chose them.

4.2. COVID-19 impact

According to 31 of 32 respondents, or 96.9%, the activities of Albanian CSO have been affected by COVID-19. COVID-19 has also become an obstacle for the implementation of CSO activities, which are postponed according to 87.6% of the respondents. In fact, 6.3% declared to have increased their activities during the period of the pandemic, preferring to see the latter as an opportunity to accomplish a better operational performance.

71.8% of CSO believe that COVID-19 has influenced their staff, while the opposite opinion is expressed by 28.1%.

The main consequence of COVID-19 is the restriction of staff movements and field research according to 75% of the respondents, followed by the reduction of personal contacts (53.1%) and advocacy activities (50%) with target groups and community. In the opinion of 37.5%, CSO staff were committed to work from home, although not excluding the possibility of reducing staff members and their associates according to 25% of the respondents.

Besides staff movement, a second consequence is the financial side of CSOs, that is the loss of funds or budget allocation (46.9%), the reduction or cancellation of projects (40.6%) and the increase in costs (31.3%).

It is important to note, that according to 18.8% of the CSO think that they have lost their impact on society, being more vulnerable in controlling government activities. Therefore, they would prefer to apply other innovative ways of working under the new conditions imposed by the pandemic (28.1% of CSO).

When it comes to the most frequent activities implemented by CSO during the pandemic, they have been respectively:

i) face-to-face and online trainings (59.4%)

ii) advocacy and organizing awareness campaigns (50%)

iii) capacity building (46.9%)

iv) exchange of information (43.8%)

v) research studies (43.8%)

vi) field research (37.5%)

vii) monitoring government activities and fund coordination (6.3%).

The frequent use of digital platforms by Albanian CSO during the pandemic, mainly in the form of online trainings and webinars, lead to the enrichment of traditional and in-person communication. It should be mentioned that many surveys, including the present research, were conducted, promoted and filled out online.

According to 75% of the respondents, staff movement and face-to-face contact have both been significantly reduced. On the other hand, 25% believe that only face-to-face contacts were reduced because of COVID-19, but not staff movements, which has continued normally.

Despite contagion risks and the restrictions of movement applied by many governments – including the Albanian one – only 25% of CSO would prefer to implement their activities online. In contrast, 31.3% of them would choose face-to-face contacts, whereas 40.6% would apply both ways. 3.1% of the respondents suggest other methods, such as holding the meetings in large spaces or open air, in respect to the rules of social distance.

As to online communication, it is precisely the crucial result of COVID-19 in public and private sectors, including CSO. This fact is also accepted by 90.7% of the respondents in the present survey, where they mention in particular online training. 34.4% of them claim that all types of communication had totally continued online, through numerous digital platforms. Only 9.4% declared to have continued communication face-to-face, as before the pandemic of COVID-19.

4.3. Civil Society Organization's finances

According to 78.2% of the respondents, the financial of their CSO have been affected by COVID-19, seriously or partly. 68.8% declared to have recorded losses of their finances, up to significant losses according to 25% of them. On the other hand, 31.2% of the respondents refuse to accept any negative impact of COVID-19 to CSO finances. By this part, 3.1% report an increase in the revenue of their organizations during the pandemic of COVID-19.

Funds earned during the pandemic are mainly provided by sources, such as:

i) other countries (37.5%)

ii) individual donors (18.8%)

iii) government and its agencies (12.5%)

iv) private sector (9.4%).

The CSO have also rich experience of implementing projects by themselves, in cooperation with national and international actors. More concretely:

i) the great part of their projects, according to 65.6% of the respondents, were carried through the funds of the European Union, while 46.9% of CSO declared to have implemented projects financially supported by international organizations and by independent funders, such as Friedrich Ebert Foundation (Friedrich-Ebert-Stiftung FES), Swiss Agency, Norwegian Embassy, etc.

ii) The same percentage of the respondents, specifically 46.9%, have implemented self-funded projects, together with projects funded by Open Society Foundation for Albania, national sources, and the United Nations, chosen respectively by 28.1%, 25% and 21.9% of the respondents. In other words, the major funding partner of Albanian CSO and their activities have been shown to be international actors, including E.U. and embassies of different European countries. Furthermore, organizations like Open Society Foundation for Albania and Friedrich-Ebert- Stiftung Tirana have had a positive impact on the operation and effectiveness of Albanian CSO.

iii) The other half of the respondents, precisely 50%, has provided other revenue sources, not mentioned in this questionnaire.

To specify more the politics that the affected CSO would potentially follow, in order to balance their own financial conditions and cut expenses:

i) 62.5% of the responded would prefer to reduce the number of trips

ii) 59.4% would reduce the plan of activities

iii) 43.8% would promote and encourage volunteer work

iv) 12.5% would reduce the staff

v) 12.5% would suspense CSO activities

vi) 9.4% would move on to freezing salaries and opening new jobs in staff.

More specific questions on the impact of COVID-19

COVID-19 has also influenced the performance of CSO with regard to public opinion, according to 65.6% of the respondents, who believe

that their work has become more or less recognized due to the circumstances of the pandemic. More concretely, 12.5% believe that the hard work of CSO during the pandemic has led the organizations to be known and more appreciated by the general public opinion. In contrast, 53.1% declare that the pandemic has weakened therecognition of CSO performance, due to the reduced face-to-face contacts. On the other hand, 34.4% of CSO do not believe that their performance has been seriously affected by COVID-19.

When CSO representatives were invited to describe the role of political polarization on their operational performance, 56.3% of them declared that the performance of CSO had become more beneficial and would serve as a pole of attraction for Civil Society contacts and activization. In contrast, 43.8% believe that the activity of their organizations was weakened due to the extreme political polarization during the pandemic period.

5. Measures taken to face the situation
5.1. CSOs and Albanian government and major foreign actors

81.3% of CSO consider that the Albanian government has taken no action to protect CSO from the multiple risks presented by the pandemic of COVID-19. On the other hand, 18.7% claim to have been supported, thoroughly or partly, by the anti-Covid measures taken by the government, such as frequent contacts with CSO and recommendations.

Almost all CSO (96.9%) that were part of the present questionnaire consider themselves not to have been included into any financial Anti-Covid package allocated by the Albanian government, nor have they personally benefited as organizations with any financial assistance during the pandemic. Only a marginalized percentage of the respondents (1 CSO or 3.1% of the sample) claims to have been supported financially by the Albanian government.

59.4% of CSO describe their cooperation in a positive manner with local institutions, such as municipalities or specific directories. Almost the other half of the respondents (40.6%) believe they had not had any experience of cooperation with local institutions.

A similar opinion prevails with regard to Albanian Ombudsman (Avokat i popullit), where 84.4% of CSO haven't had any experience of cooperation, in contrary to 15.6% who describes as correct their

relations with Albanian public advocate. Despite the lack of cooperation with crucial actors, such as government, self-governing power and public advocate, the majority of CSO (87.5%) do not express any major complaints about the freedom of speech during the pandemic. Unlike, 12.5% claim that their CSO freedom of speech had been weakened importantly, as a consequence of COVID-19.

When it comes to political representation of CSO, or in other words how efficiently is the voice of CSO heard by the political power and political elites, only 6.2% of the respondents claim to have felt the improvement of their political representation during the pandemic. In contrast, the overwhelming majority of CSO (93.8%) believe that their political representation has remained stagnant, like what was happening before COVID-19 (62.5%), or at worst has weakened further during the pandemic (31.3%).

Another negative impact of COVID-19 on CSO concerns the latter's cooperation with other countries' organizations, international and regional actors, as well as the European Union. So, only 9.4% of the respondents believe that their relations with such actors and institutions have been importantly improved during the pandemic, including their CSO participation in E.U. projects. The overwhelming majority of the respondents (90.7%) consider this sort of cooperation to be stagnant, or at worst declining.

5.2. Relationship with Media

CSO cooperation with media is critical, not only to the coverage of activities, but also to democratic information and emancipation of citizens. Such an indicator that shows how fragile democracy is in the times of digital information has to do with the spread of conspiracy theories, a common phenomenon during the pandemic of COVID-19. Only 25% of the respondents believe that their relations with media have been improved during the pandemic, whereas 75% consider these relations to have remained stagnant (according to 46.9%) or declined (28.1%). Additionally, 87.5% of CSO have not conducted any specific research or organized any activity with regard to conspiracy theories and their dimensions. This means, among other things, that CSO themselves – or supported by other actors – have not undertaken any initiative that might serve for the potential filtration of fake news and conspiracy theories.

6. New opportunities for the CSOs

Asked about what new opportunities COVID-19 might have opened up to Albanian CSO, it was found that:

i) Acceleration of digital transformation (78.1%) and reorientation of activities (59.4%) are perceived as the two main novelties.

ii) Other minor opportunities perceived by Albanian CSO are the exploitation of internal financing opportunities (12.5%), strengthening the credibility in civil society (9.4%), increasing CSO impact on society (9.4%), and strengthening CSO advocacy (6.3%).

iii) Finally, a moderate majority of 65.6% of CSO feel optimist about the future of Civil Society in Albania, in contrast to 34.4% who express their pessimism and skepticism about the perspective of Albanian Civil Society and CSO.

Conclusion

This study showed that COVID-19 Pandemic has had, among other things, a negative impact on the organizational, operational and financial dimensions of Albanian CSOs. Based on the results of the study, the direct and indirect consequences are:

i) the restrictions in staff   movements,

ii) the postponement or cutting of projects and other activities, in particular of face- to-face activities,

iii) the losses in CSO finances and the delays in funds allocation,

iv) the consolidation of online meetings and training as the main channel of communication.

Even though CSO's work was apparent and more recognizable to public opinion and might also offer a more reliable role to Albanian society, described by the extreme polarization, they still remain weak. This can be illustrated with the duality of the results when the CSOs were asked about the role of political polarization in their operational performance. Political polarization is not the only element/consequence that the Albanian CSOs are vulnerable and weak. The vulnerability of Albanian CSO can also be explained by the passive role that the Albanian government and other institutions in Albania applied with regard to CSOs during the pandemic, for example their exclusion in any anti-Covid package or supported financially by the government.

Furthermore, there was no attempt to improve the relations of CSOs with local institutions, media and Ombudsman. Likewise, COVID-19 had a negative impact on the cooperation of CSO with the European Union, international organizations and other countries' agencies. Joint projects and activities with these actors have remained on paper or their implementation has temporarily stopped.

Based on the results and answers taken from the data gathering, it can be concluded that there exists an awkward situation concerning democracy, even though the freedom of speech remains consolidated in its great part. There exists a fundamental conflict about the relationship between the Civil Society Organizations that are trying to implement and push for an agenda that is based on liberal discourse and includes representative democracy and in the other hand a balkanized government engaged in practices that are not fully understandable and transformable by the society and the Organizations themselves. This problem shall take a longer time to be fully resolved institutionally in Albania. This refers to the weak representation that the CSOs have in the political processes that limited the impact that their recommendations have to political elites. Additionally, it seems that the spread of conspiracy theories has increased during the pandemic, with CSO not to have contributed enough in filtering the fake news and disinformation and the real news. In other words, the CSOs, either by themselves or supported by other actors, have not undertaken any initiative that might serve for the potential filtration of fake news and conspiracy theories. Online communication and acceleration of digital transformation in general appear to continue to be the main challenges faced by CSO the day after COVID-19.

Despite the difficulties mentioned above, Albanian Civil Society Organizations are optimistic about the perspective of Civil Society in their country.

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CONCEPTS ON SCIENTIFIC THEORIES AND IMPLICATIONS FOR EPISTEMOLOGICAL APPROACHES

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Abstract
Rationalist theories in epistemology represent an attempt to respond to some concerns related to scientific cognition and its problems. This view is constituted, on the one hand by confronting existing theories and, on the other hand by offering alternatives with adequate claims, which has led to a multitude of different theories and views.

The common denominator of epistemological theories is that all without exception are derived from the history of the development of science, a history which serves to construct relevant theories that cover all the development of science, and at the same time explain that in the sense of how scientific activity should be developed in various researches.

The aim of this paper is to present the specific perspectives of each of the approaches, whether epistemological or scientific. Also what features do they consider characteristic during the scientific development of science and how do they think that scientific research should be exercised as an activity of scientists.

*Keyword***:** Science, Verification, Scientific paradigms, Competition of scientific programs, Epistemological anarchism

Introduction

Epistemology appeared, in a way, together with the birth of philosophy, but then formed as a separate direction, in the sense that it dealt with the study of cognition in general, being specified as a theory of cognition. Peter David Klein gives this definition: "Epistemology is one of the fundamental fields of philosophy.[1] It deals with the nature, sources and limits of knowledge ", while George Sotiros Pappas, gives a slightly different definition:" Epistemology has always dealt with issues such as the nature, growth, sources and legitimacy of knowledge " [2] In this sense, only already limited to a particular field, epistemology, as defined by Popper, was transformed into scientific cognition, coming to a dominant profile that is rationalism in epistemology[3]. The close connection of philosophy with science and vice versa, of science with philosophy, makes it necessary, a brief presentation, of the way to the creation of epistemology as a separate discipline of philosophy. This, in fact, is important, at least for a number of reasons. On the one hand, because it has a long way to go as formation as a separate discipline and that, in a way, although it has defined its field quite clearly, it has inherited many aspects of philosophy over the centuries. On the other hand, by showing, briefly, the complexity of cognition, its flows and sources, it will be possible to understand more precisely the peculiarities of epistemology. Therefore, in the following, the historical aspect of the establishment of epistemology as a philosophical discipline will be presented, starting from the origin to the rationalist theories in epistemology.

Origin

Although epistemology was created as a discipline recently, sometime in the early twentieth century, it was not formed all at once and simply as a result of contemporary endeavors, but, in a way, it is the result of a long process through the centuries. The origin of cognition goes back to the attempt of homo sapiens, if not beyond, and, as Popper says in his article Back to the presocratics, the genuine efforts of cognition

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[1] Peter David Klein, professor filozofie, Autor I vepres: Certanty, A refutation of Scepticism (1982)

[2] George Sotiros Pappas (1942) me origjinegreke, I specializuar ne epistemiologji

[3] Karl Popper, Vepratezgjedhura, pergatiturnga David Miller, Botimi ne shqip , perkhtyerngaarjanStarova, Botuarnga Soros &Aferdita, Fq 58

appear in pre-Socratic philosophy,at least in the sense they have reflected in direction of a theory of cognition. The foundations of epistemology, as a theory of cognition, as generally accepted, are laid out in the works of Plato, when a theory of cognition is first introduced, where, in a way, it is considered a product of the logos[4] . The fog and ambiguities that remain in Plato are dispelled by Aristotle by defining more clearly the epistemological theory, which, in Nicomachean Ethics, treats it in the quality of the virtues of the soul, conceiving it as a field with some sub-directions, as scientific knowledge, knowledge of power, wisdom, understanding, wisdom, practical knowledge. However, what is probably more important for this study is the development of a special epistemological concept, that of scientific knowledge by Aristotle, made in his work Posterior Analytic.[5] This scientific knowledge, as Aristotle puts it, has much in common with what is believed to be a scientific theory: several theorems, each of which is proven in a demonstrative syllogism, and principles which serve as premises to achieve in conclusion, which derives its authenticity from the first premise or principle. This is where the first serious attempt is made to define scientific theory, namely its structural elements, since Aristotle sets out, as Pappas states, a certain fundamental position on scientific theory. Subsequent developments have brought few innovations related to epistemology as a theory of cognition, until Francis Bacon and Rene Descartes, who are, in fact, the initiators of the modern project of research technique, respectivelyof methodological rules, appeared on the scene of thought. as the basic approach. From the Baconian and Descartian approaches, but also from the directions that were characterized as rationalist and empiricist, stems the birth of epistemology, associated with the attempt to provide, on the one hand, a technique of attaining knowledge as a safe tool and, on the other hand other, the safest source to achieve it, these efforts deserve attention. The fundamental issue: the research technique In this paper we will follow the opinion of Michael Oakeshott, because it seems adequate and common to what will be addressed throughout this study. Both Francis Bacon and René Descartes were fascinated by the great scientific achievements of their time, which led to great transformations of perception on science, influencing exactly this,

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[4]Platoni, vepraRepublika, fq 52
[5]Aristoteli, Etika e Nikomaut, Translated by Terrence Irwin fq 89

science, to become a model for that part of the philosophy that was taken with cognition, epistemology, to which they wished to lay a solid footing and in the example of the natural sciences, mathematics and geometry. In epistemology[6], Bacon, in his work Novum Organum, which translated from Latin means the new instrument, in addition to aiming at a different logic from that of Aristotelian syllogisms, was necessary (because, according to Bacon, 'the state of knowledge is not even prosperous nor advanced ') to overcome this condition, to achieve a secure and demonstrative knowledge of the world. To achieve this, writes Becon: "There remains only one course for the recovery of a healthy and healthy state - that is, that all the work of understanding start from the beginning, and the mind itself from the beginning is not allowed to take the flow. its own, but to be guided at every step ". What, in fact, Bacon requires is a secure plan, a new way of understanding, an art or method of research, an instrument that would fill the weakness of natural reason and to achieve this, so the formulation is sunnah of a research technique, which would have three main characteristics. First, they would be a set of rules that would define an exact technique; second: that set of rules would be merely mechanical, in the sense that it does not require any other knowledge or intelligence not given in the technique itself; third: that set of rules has universal application, and this, as an accurate technique, is an instrument disregarding the subject of the research subject. Thus, he was looking for infallible rules of scientific discovery, a key to open all the doors, and, according to him, it was necessary for "a new beginning from solid foundations", and this, for Bacon, was the inductive method, or inductive search process. This claim of Bacon to create a technique that provides security in the search and achievement of scientific knowledge, Oakeshott calls, in political terminology, as the sovereignty of technique [7]. The same thing was investigated by René Descartes: the lack of a conscious and accurate formulation of a research technique.[8] Therefore, with the same objectives as Bacon, Descartes, in his two works Discourse de la methód and Regulae, aims to formulate a research technique, the main purpose of which would be to achieve security. According to Descartes, certain knowledge can only be attained by minds discharged from

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[6]Oakeshoot, Rationalism…, fq 18
[7] Po aty fq 19
[8] Po aty fq 21

overload, so the technique finds an undeniable foundation, which Descartes found in the saying - Cogito, ergo sun (I think, therefore I exist). Descartes's search technique also consists of some basic rules, which give security to the search and achievement of recognition as well as security. Search rules are composed so as to create an infallible method, the application of which is mechanical and universal. According to this method, there are no levels of knowledge, what is not certain is not scientific. Thus, like Bacon, Descartes, only he who is inspired by geometric demonstrations, undertakes the project for an infallible and universal research method. What can be said about the projects of the two philosophers, Bacon and Descartes, is that their effort was directed towards finding a methodology, on which scientific research would be based to reach only certain knowledge. The whole progress of modern science over that of traditional science seemed to have become more technical, as if it were entirely based on research techniques, so much so that it was sufficient to formulate certain principles, norms or rules, the application of which would lead to new knowledge and scientifically sound. Although both Bacon and Descartes intended, it was Hobbes who made it clear that in order for scientific research to succeed, different methods, ie different research techniques, are not needed, but the same method which would be applied in the studies of nature, human nature and the nature of human society. According to Hobbes, in order to achieve accurate knowledge, it was not important to determine the object of study, the research technique was sufficient - the method of observation and the deductive reasoning of the axioms created by the observation. But could it be so? Was just a method, or a research technique, enough for science to attain certain knowledge? It seems that this was not all, as the philosophers would face another challenge, without which, according to their approaches, the intended certainty of scientific knowledge could not be achieved: the source of knowledge.

Purpose: scientific security
While the views of Bacon, Descartes, and Hobbes, the first to attempt to establish a methodology, were at the same frequency with regard to method, in the sense that it was the research technique that enabled the attainment of sound scientific knowledge, it had to supplemented also with something that was necessary to make scientific cognition

completely certain: the source of cognition. Descartes considers that the primary source of knowledge is reason and even, it was the only one that could tell us what is true and what is not. This is expressed by Descartes in his work Discourse de la methód, in its subtitle: how to orient reason and seek the truth in science. More specifically, he states this in the Rules: "All sciences are nothing but human reason which is always the same. Both Spinoza and Leibniz considered reason as the surest source of knowledge, as the primary source of knowledge of truth. Descartes, Spinoza and Leibniz are the founders of rationalism, at the core of which it was thought that various assertions (whether about nature, man or society) through reason and only through it, of course guided by the technique of scientific research, could to appreciate them and to know what is true and what is false. Experience is secondary. Bacon, Hobbes, Locke, Hume, etc. thought differently. The common denominator of their views was that the source of our knowledge is experience. According to Hobbes: "in the human mind, there is no concept that is not initially caused, in whole or in part, by the sense organs." Both Locke and Hume think along these lines: any idea that does not refer to experience is empty and false. With these views, Bacon, Hobbes, Locke, Hume became the founders of empiricism as a philosophical direction, at the basis of which it was thought that the various assertions (whether they be about nature, man or society), guided by reliable research technique scientific, can be judged for truthfulness insofar as they refer or not and correspond or do not correspond to experience, which means that it is experience that proves the truth or falsity of a statement. And the reason is secondary. Despite reaching different conclusions, the common denominator for both rationalists and empiricists was the belief that there is a source, with a primary and decisive role, which can provide security in our knowledge. But could it be so? Was there really a single source that made recognition safe? And, could, indeed, that source be so secure? Moreover, which of the two sources of knowledge was the safest: reason or experience? These remain open issues and, perhaps, for epistemology, they became a serious problem. The situation remained the same, until Immanuel Kant came up with a synthesizing approach.

The evolution of epistemology

From the above it can be seen that the epistemological views were outlined with opposing views, both in terms of the method they believed was typical of scientific research and the only one, and in terms of what was the primary and decisive source of knowledge. But did science work that way, or rather, could it work that way? However, despite their differences, it should be noted that both approaches, rationalist and empirical, represent, in the first place, a reform in epistemology, a change from the traditional one, transferring it to the sphere of scientific knowledge. In this regard, two prominent figures are important in unifying the epistemological approach and in laying its modern foundations: Imanuel Kant and Auguste Comte.

Conclusions

From what has been stated above, a transformation can be seen in the preoccupation of epistemology. Its traditional character, that as the theory of human cognition, of general cognition and in all spheres, came by changing character and becoming a concept that refers to scientific cognition. Of course, such elements are found in both Plato and Aristotle, but these turned epistemology into a disciplinary preoccupation for scientific cognition starting with Francis Bacon and René Descartes, and this became a major trend until Kant marked the unification of epistemological foundations. , while Comte stripped epistemology of external authorities, which by one name might be called metaphysical authority. Conceived in the modern sense, the real foundations of epistemology have been laid by Comte, as he orients the preoccupation and attributes to it the exclusive character - dealing with scientific issues, problems and challenges. Based on the concept of Gaston Bachelard, in Vocabulaire technique et critique de la philosophie (Technical Dictionary of Philosophical Criticism) published in 1927 in Paris, the character and field of epistemology André Lalande (1867-1964), defines it as: philosophy of science, but only in a certain sense, which studies issues of how scientific concepts are formed and changed, how sciences operate on each other, how new scientific disciplines are formed, and so on.

A clearer and more concrete concept is given by Popper: "I call epistemology the theory of scientific cognition." In this sense, according to Popper, epistemology "belongs to the study of scientific

problems and problematic situations, scientific conjectures ...,
scientific discussions, critical arguments and the role played by facts in
argumentation." Thus, it seems that epistemology has been clarified as
a discipline that deals with scientific cognition and its various
problems. The discipline of epistemology has been clearly formulated
by Aleksandër Kocani, according to whom it not only stands in a dual
relationship with both philosophy and science, but epistemology also
belongs to both: "Philosophy, because it is a study of thought and
demarche scientific to understand, among other things, where the
specific character of scientific cognition lies in relation to ordinary
cognition. Science because it claims, first, to be a scientific study of
science itself, which aims to elaborate concepts and ways of self-
reasoning with the same rigor and objectivity as science; secondly, in
that it requires a measure of validity for its concepts, methods and
conclusions.

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LOGICAL-LINGUISTIC AND CONCEPTUAL CORRECTIONS IN THE SOCIAL SCIENCES IN ALBANIAN LANGUAGE

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Abstract
Over the years we have led discussions in sociology classes held with students studying social sciences at the University of Tirana. We have noticed that many students articulate with logical errors not only complex scientific concepts, but also phraseological units and words that are often used in everyday life. During seminar hours, confusing and misinterpretation situations are often created among students, in which they unintentionally offend certain social groups, relatives and even themselves. Such misunderstandings often damage communication in the media as well, especially the quality of communication on the different types of talk shows. To overcome such situations, it is necessary, first of all, to correct errors of this nature in social science textbooks.

This paper aims to identify some of the main logical-linguistic and conceptual misunderstandings in the social science textbooks used in pre-university and university schools and to suggest "mechanisms" for overcoming them.

The main issues that will be discussed in this paper are:

    1.   General expressions such as: "all Albanians think ...", "all the inhabitants of the city are worried …", etc., are not only logically wrong, but are used to evaluate positively or to unfairly accused many Albanians for many things.

2.   Naming historical periods not based on the functioning of political structures like "kingdom", "republic", etc., but with the names of politicians idolized at one time and hated later.

3.   Misuse of synonymous terms such as "fatherland", "motherland", "homeland", etc., in different social contexts.

4.   Misuse of possessive adjectives in expressions such as "our time", "my government" etc.

5.   Meaningless use in social sciences of words like "excessive", "extreme", "infinite" etc.

Introduction

In improving the logic of communication among Albanians, directly and indirectly, interact in a set of factors such as family and school, various media, especially various television programs and fiction, communications with sophisticated electronic techniques, etc. We think that a very important element that reinforces the influential power of such factors is the language of social subject textbooks circulating in pre-university education, from the first to the twelfth grade. We have found that in the linguistic logic of the elaboration of such texts there are various shortcomings, which affect the linguistic and intellectual malformation of students. This is a very wide field of research, which would be good to be the subject of a complex nationwide study (to include the entire Albanian space in the Balkans) and financially supported by the relevant state structures. While in Albanian society the waves of problematic anarchy still hit the education system, such a research project still seems quite distant. In these circumstances we will try to address in a multi-year study (this volunteer work) the main shortcomings in the logical-linguistic representations of social knowledge in school textbooks, starting with those of high schools.

By correctly applying the standards of academic writing we will refer accurately to social subject texts, but without mentioning the name of the author or authors and the publishing houses that published them (This data will be complete in manuscript We are ready to make it available to any author or publishing house that may request it). Thus we will somewhat deviate from the academic standards because we do

not consider this study as a controversy with the authors of the textbooks and with the employees of the publishing houses, but as a friendly help for the improvement of their work for the realization of the textbooks. In the social sciences, excellence is a notion of limit, which is not achieved, but which needs to be constantly targeted not only by young authors, but also by the most experienced ones. To review the importance of school textbooks for the multifaceted civic formation of Albanians, it is enough to remember that among the first authors of textbooks in the Albanian language was the most important personality for the Albanian nation after GjergjKastrioti - Skënderbeu, the magician of the Albanian word, national poet NaimFrashëri. Many other great renaissances have also written texts in Albanian for schools.

1.   Extreme,problematic generalizations

In many textbooks of social subjects that have been circulating in recent years in the high schools of the Republic of Albania, there are extreme generalizations, which from the logical-linguistic point of view are wrong. To concretize it, we will refer to a lesson of a text "Citizenship" (Tirana 2016, p. 67). The title states: "Preservation and development of the environment, the responsibility of all." Being it specified: *of all people*. But beyond this clarification the question arises: "Can such a responsibility, no matter how vital, weigh on all the people of planet Earth? The concept also includes young children, who for reasons of age do not walk on their own feet, do not speak and can not perform any premeditated action to protect the environment. The concept of "everyone" also includes very old people and in very serious health conditions, even in a coma.

Should children of this age group and the sick be held accountable in the role of environmentalists, or should the language of the text be modified to avoid such errors arising from generalizations beyond logical and reality targets. Such mistakes could be avoided with formulations of this nature: "*Preservation and development of the environment, the responsibility of all conscious and capable people*". On the 4th lecture, with the title "Human rights" addresses the issue of fundamental, constitutional rights. In this lesson are used as the same two characterizations: "Constitution of Albania" and "Constitution of the Republic of Albania". Correct is the second. The characterization of the "Constitution of Albania" is not only wrong from the historical

and logical-current point of view, but also justifies the anti-Albanian claims of the Serbian chauvinist circles. Currently, the Albanian space in the Balkans, where the vast majority of Albanians live, is about 60 thousand square kilometres. At the end of the XIX century, according to the writings of Sami Frashëri, this space was 80 thousand square kilometres (1988-: 39-40). Shortly after the independence of the Albanian people from the Ottoman Empire, the compact space inhabited by Albanians in the Balkans was fragmented. Currently, the Albanians, the earliest in the Balkans, live in their lands scattered in 6 countries: the Republic of Albania, the Republic of Kosovo, the Republic of Montenegro, the Republic of Serbia, the Republic of Northern Macedonia and the Republic of Greece. No people in Europe has been forcibly imposed such a tragic fate by the powerful European states of the time. Since 1913, no legislation, not even an approved constitution for certain parts of the Albanian-inhabited area in the Balkans, has been in force for other parts. Even the Constitution of the Republic of Albania has no force in force in the territory of the Republic of Kosovo, where the vast majority of Albanians live. And this constitution is unlikely to have an impact in other Balkan countries where Albanians are in the minority, is less than half the population.

In a text "Filozofia 11 (Philosophy 11)" (Tirana, 2017) it is emphasized in capital letters, in red, the statement: "The truth" according to the Greeks, and later according to the Latins, is the approach to reality "(p. 16) . This generalization, perhaps with the highest degree of generalization in some planes, can not but be wrong. *Firstly*, we are not talking about Greek and Latin philosophers, but about Greeks and Latins, that is, the entire Greek and Latin population, which in the course of several centuries numbered several millions.

Secondly, no time period is defined. The concept of the Latin population is more limited in time, i.e. in the course of several centuries. While the concept of "Greeks" is much more extended in time. From the time of Socrates to the present day is a time interval of about 25 centuries. The Greeks who have lived during this time are tens of hundreds of millions. Is it possible that the hundreds of millions of Greeks and Latins who have come and gone from this world over the course of some 2,500 years all have a common view of the truth? It is necessary, or more precisely necessary, to change such formulations,

which, having a high degree of generalization, move far away from truth, from reality, pass into the zone of error to the point of absurdity. Even the statements with a high degree of generalization that are frequently articulated in the textbooks of social studies of high schools have influenced that many Albanians start public communication with stereotypical expressions: "the Albanian people who in ancient times have acted one way or another", that in earlier times the Albanian people had this or that habit "etc. Even under the influence of such formulations in school textbooks a positive phenomenon and most often negative, a flaw or wrong judgment of Albanians today is interpreted as coming from the beginning of history. Meanwhile, the early periods of the history of the Albanian people have not yet been studied scientifically.

2. Synonyms that are not such in different social contexts

In the Albanian language, two words are used to characterize the country, in the broadest sense of the word, where a person is born, where his parents or their first parents were born: *motherland* and *homeland*. Our great renaissances NaimFrashëri, NaumVeqilharxhi, Petro NiniLuarasi, Sami Frashëri, etc., used the term "mother" more frequently for Albania. They articulated this term orally and in writing to express their closeness to the land of their ancestors, which was languishing under occupation by the Ottoman Empire. The motherland was often characterized as "mother earth" or as "mother earth". Meanwhile, the word "homeland" expresses the birthplace of the father or father. The use of these two words is not a coincidence, but neither are they synonymous. To understand the differences between them, we will refer to the lives and activities of people who have parents with different nationalities. It most often happens that such people are included with priority in the line of developmental interests of the homeland, that is, to identify themselves with the national affiliation of the father. This is also influenced by the fact that the vast majority of people in the world officially bear their father's surname. Historical experience shows that in the situation of fierce conflicts between the state politico-military structures of the nation, to which the father belongs and to which the mother belongs, such persons are engaged with priority or entirely on the side of the homeland or the motherland.

A situation from the history of the Albanian people. In the years 1443-1468 GjergjKastrioti - Skanderbeg was a symbol of the military resistance of many peoples of Eurasia against the invading pressure of the Ottoman Empire, which was the greatest aggressive military power of those years and for several centuries after. GjergjKastrioti-Skënderbeu was not a king, he was the leader of the Albanian people in the wars against the invading army of the Ottoman Empire. The halo of glory of GjergjKastriot - Skanderbeg eclipsed all the crowns of the kings of Europe. To be in the service of this leader in those fiery years meant to be quite honourable. For several years the person who kept GjergjKastrioti closer was his nephew from his brother (Reposh's son), HamzaKastrioti (Sirdani, M., 2001: 13). He betrayed his uncle, and in collaboration with the army of the Ottoman Empire opposed him at gunpoint. When we talk about such an act of betrayal, we ignore the fact that HamzaKastrioti only had an Albanian father, so Albania was only his *homeland*. While the mother was Turkish. His motherland was Turkey. HamzaKastrioti betrayed the homeland on behalf of the motherland, so he went to half of his blood. Only in these circumstances did HamzaKastrioti support the aggressive, unjust war of the Ottoman Empire, that is, of the motherland against the just liberation war of the Albanian people, that is, of the homeland.

In 1987 the poet Joseph Brodsky (1940-1996) was awarded the Nobel Prize, the highest, most appreciated in many fields in the field of literature. When he landed at Stockholm Airport, before receiving the award, reporters asked him the following question: "You are an American citizen who is receiving an award for poetry in Russian. What nationality do you belong to?

He replied: "I am a Jew - a poet in Russian and an essayist in English." Those were still the years of the "cold war" in which the mostpowerful rivals were the former Soviet Union and the United States. Although he had lived in these two countries, he had written in their most widespread official languages, Joseph Brodsky, in many thoughtsand actions, in spiritual sensibilities and social visions appeared as a Jew (See: Balliu, B. 2021: 288).

3.   Misunderstandings of owners and antonyms

In the textbooks of social subjects that circulate in high schools, there are inappropriate uses and even abuses of the owners, treatments as

antonyms of words, of concepts that are not like that. For example, a text "Citizenship 10" (Tirana 2009) states: "Our legal system is influenced by our traditional ideas of what is right and what is wrong" (p. 20).

Firstly, in this issue of teaching we do not talk about the legal system of Albanian society, but about that of human society as a whole. In this context, the owner "ours" is completely meaningless because we are talking about legal systems that have functioned thousands of years ago than contemporary legal systems, in a "segment" of which live Albanians along with the authors of this text.

Secondly, with the phrase "our traditional ideas" ownership is quite broad, even clearly undefined. If we talk about "traditional ideas", the generations of people living in society today inherit them from their ancestors, so they can not be theirs.

Thirdly, modern and postmodern societies, especially after the Second World War, tend to be less and less influenced by traditional ideas in any field of activity, including the field of legislation.

Fourthly, the words "right" and "wrong" are misused as antonyms in this statement. The antonym of the word "right" is the word "unjust" and the antonym of the word "wrong" is not the word "right", but the word "true". Such confusions of these and other antonyms are found in almost all high school textbooks, which are often reflected in the discussions of pupils, students and Albanians in general.

4. The term "communist regime" does not express the Albanian reality

In the textbooks of social subjects that are developed in high schools, the period December 1944 - December 1990 is often characterized as "period of the communist regime", "years of communism", "period of the communist order", etc. In a text, "Citizenship 10" is highlighted in bold: "To create a clearer idea of the problems of raising a teenager, let's look at what the problems with adolescence were like during the communist regime" (p. 110). The characterization "communist regime" has penetrated school textbooks as borrowing from vulgar anti-communist propaganda. As such it is inaccurate in some respects. The very founders of the doctrine of scientific communism Karl Marks and Frederick Engels have called this period of reorganization of post-capitalist *society the first phase or phase of socialism* (1989: 148).

The basic legal documents of the Albanian state after the Second World War do not mention the communist regime. In the "Statute of the People's Republic of Albania", approved by the Constituent Assembly of the Albanian state on March 14, 1946, the order is not defined as communist. Article (article - members) 1 of this statute states: "Albania is a people's republic, where all power comes from the people and belongs to the people" (*GazetaZyrtare*, no. 19, 19.03.1946: 1).

The Constitution approved by the People's Assembly on December 28, 1976 is considered as the constitution that sanctioned the important achievements of the Albanian society in the way of building socialism. Even this constitution does not speak of communist order or regime as an achieved reality. Article 1 of this constitution clearly defines, without equivalence, the nature of order in the Albanian state: "Albania is a Socialist People's Republic". Article 4 further details the nature of the political and social order: "The Socialist People's Republic of Albania develops the revolution without interruption by adhering to the class war and aims to ensure the final victory of the socialist path over the capitalist path, to achieve the full construction of socialism and communism (1977: 9, 10). The Constitution states very clearly that in the People's Socialist Republic of Albania the construction of the socialist order had not been completed, while communism was conceived as a distant, almost asymptotic perspective.

This period was related to the name of Enver Hoxha, who in the years 1945-1990 was anthemized, considered as "genius", "great helmsman", "the greatest leader of the Albanian people", etc. After 1990 such characterizations turned to the opposite. He was labelled as "Dictator", "ignorant", "deceased" etc. In many ways such characterizations are harmful. This is how King AhmetZogu was treated. Despite the positive or negative emotions that have provoked or still provoke naming the time with particular names of politicians is not only wrong but also harmful. They can not be the owners of time, nor its representatives. In the poem "The Time of the Peoples" Ismail Kadare ironized this tendency to identify time with the names of politicians. With grotesque logic he said: "*Kapasurvitetëmamuthëve/ Po kohëtë tyre s'patikurrë* (*There were years of mammoths / But their time never came*)" (1981: 307). Instead of the characterizations "Zog's time" and

"EnverHoxha's time" it is necessary to articulate the statements "years of the kingdom", "years of the totalitarian socialist regime".

Conclusions

This article comes as a test to start a constructive debate on the importance of logical-linguistic and conceptual corrections in the social sciences in Albanian language. Social sciences are complex and constantly evolving sciences. Often the Albanian language seems insufficient to express all the concepts of the social sciences and to adapt the right words to the Albanian language, no matter how rich this language really is. And yet, referring to our experience, it is imperative that textbook authors be careful in considering the importance of linguistic logic and its correct use. It is noticed that in many textbooks of social sciences a radical editing is needed to correct various concepts expressed in contradiction with the logical linguistic context of the Albanian language. For this reason, this article is just the beginning of a systematic work to draw attention to the importance of linguistic logic in the textbooks with which students study in the schools of the Republic of Albania.

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THE CONTROL OF THE CONTENT OF TELEVISION BROADCASTING. IMPLEMENTATION OR VIOLATION OF CHILDREN'S RIGHTS?

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Introduction

The right to information is one of the leading pillars of the children's rights catalog, guaranteed by Article 23/1[1]of the Constitution of the Republic of Albania and Article 10 of the European Convention on Human Rights.[2]

Access to information affects the implementation of the right to individual development, freedom of expression and personal views, the right to participate, etc. Thus, the exposure to diverse information, including television programs, raises serious issues regarding their growth, education, and development. Subsequently, there is an urgent need to protect children from access to inappropriate and harmful information, to their age and capacity, aired by audiovisual media.

According to Article 17 of the Convention on the Rights of the Child (hereinafter CRC): *States Parties recognize the important function performed by the mass media and shall ensure that the child has access to information and material from a diversity of national and international sources, especially those aimed at the promotion of his or her social, spiritual and moral well-being and physical and mental health.*

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[1] The right to information is guaranteed.
[2] Everyone has the right to freedom of expression. This right includes the freedom to receive and impart information and ideas without interference by public authority and regardless offrontiers.

Every decision-making of public authorities including the selection and broadcasting of television programs should be guided by the best interests of the minors, to protect them from inappropriate content.[3]

Notwithstanding the lack of social sensitivity, the paper tries to highlight a precise issue, the existence of which jeopardizes animportant public interest: the protection of the physical, psychological and moral development of minors from the inappropriate content of television programs due to their age and intellect.

The comparative approach to the concept of "inappropriate content" of the Code / Regulations, for the protection of minors in the audiovisual broadcasts of the countries: Northern Macedonia, Kosovo, Romania, and Albania, tends to identify the flaws in the Broadcasting Code of the Albanian Audiovisual Media Authority.

The methodology rejoins the purpose of the research and is based on documentary research, comparative analysis, and case law of the European Court of Human Rights and the European Court of Justice.

Legal framework

Children enjoy special protection by the state, guaranteed at the constitutional level[4] and internationally, thanks to covenants ratified by the Republic of Albania. Unambiguously, the Preamble of the Convention on the Rights of the Childstates:

*"The child needs special protection and care, including adequate legal protection, both before and after birth."*Hence, the state must take all necessary legislative, administrative, social and educational measures to protect children from any form of physical and mental violence."[5]

In this context, children should be protected from the content of television programs that may adversely affect their physical, psychological, and moral development.

Correspondingly, State Parties shall encourage the mass media to disseminate information and materials of socially and culturally beneficial use to the child[6]and shall encourage the development of

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[3] Article 42 point 6 / DH, the Law on the Audiovisual Media Authority of Human Rights and the European Court of Justice, addresses current issues related to the protection of minors from audiovisual broadcasting.

[4] Article 54/1, the Constitution of the Republic of Albania.

[5]Article 13, Convention on the Rights of the Child.

[6] Article 17/a, Convention on the Rights of the Child.

guidelines necessary for protection against information and materials that are detrimental to his or her well-being.[7]

The European Convention on Transfrontier Television of the Council of Europe is an international instrument aimed at protecting children from the inappropriate content of television broadcasts.[8]According to 7/2: *"All items of program services which are likely to impair the physical, mental or moral development of children and adolescents shall not be scheduled when, because of the time of transmission and reception, they are likely to watch them."*

The protection of moral and legal requirements of children in audiovisual broadcasting in the Republic of Albania is sanctioned in the following laws:

-Law no.97 / 2013 "On Audiovisual Media, which is aligned with Directive 2010/13 of

the European Parliament and the Council. Article 46/2 / DH stipulates that Audiovisual Media Service Providers must subject their activity to respecting the best interests of minors and are not allowed to broadcast programs that could seriously harm the physical, mental, or moral development of minors, in particular programs that contain pornography or that present scenes of extreme and artificial violence.

- Law no. 18/2017 "On the Rights and Protection of the Child", provides special protection for the fundamental rights and freedoms of children during the broadcast of audiovisual programs, charging legal responsibilities to audiovisual broadcasters in case of violation.[9]

A comparative approach

In this section, the research focuses on the concept of "harmful content", identifying components, program categorization, classification criteria, and broadcast schedules based on it. The study focuses on the Broadcasting Code of the Audiovisual Media Authority(hereinafter referred to as the AMA Code), the Regulation "On the Protection of Minors"[10] of the Republic of Northern

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[7] Article 17/ e, Convention on the Rights of the Child.

[8] Article 7/2, European Convention on Transfrontier Television.

[9] Law "On the rights and protection of children", article 17/7.

[10]Approved by Decision of the Council of the Agency for audio and audiovisual media services on 21.11.2014.

Macedonia, the "Regulatory Code on Audiovisual Content"[11], the Republic of Romania, and the Regulation on the protection of children and juveniles from audiovisual media services"[12] of the Republic of Kosovo.

The abovementioned instruments have the main purpose of protecting children and minors from the contents of programs that negatively affect (or may affect) their physical, mental,and moral development,[13]by submitting audiovisual broadcasting to specific rules of a control system. It is worth mentioning, that conditional access or encrypted programs, should not be transmitted in schedules when children areattending[14]andshould be preceded by an acoustic warning or identified by the presence of a visual symbol throughout them.[15]

Broadcasting Code[16], is the regulatory actionthat is drafted and approved by the Audiovisual Media Authority (AMA)[17].

The aforementionedencompasses the basic principles of broadcasting, as well as the regulationof the audiovisual activity, paying special attention to the principles of the protection of children in audiovisual broadcasting. In detail, section V has defined the legal and moral requirements that the media service providers must recognize.

The Code Introductionspecifies that the issues included are not exhaustive. Ensuing, the notion of harmful content remains undefined, exactly as in the Law "On Audiovisual Media Authority". From a prima facie point of view, we do not find the term " harmful content" explicitly defined, hence leaving open the interpretation possibility. Taking into consideration, the provisions inharmony with each other, harmful content involves the totality of elementssuch as -advertising alcoholic beverages, foods, and beverages, which contain substancesharmful or useless to the physical health of minors, especially those with high content of fats, fatty acids, salts, soda, and

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[11]Approved by Decision no. 220, dated 24.02.2011 of the National Council of Audiovisual Media

[12]Approved by the Independent Media Commission, decision 2012/01.

[13] Regulations for the protection of children and minors from audio-visual media services.

[14] AMA Transmission Code, section I, point 1.13.

[15] AMA Transmission Code, section V, point 5.53.

[16] Approved by the Decision of AMA, no. 228, dated 11.12.2017

[17] Law no. 97/2013 "On the Audiovisual Media Authority", article 19/4.

sugar, which are beyond the norms allowed for a healthy food diet for minors[18]

-transmission of pornographic programs without protecting minors throughconditional access devices and parental control[19]

-scenes of extreme violence and those with sexual content[20]

-inappropriate communication[21]

-communications of a commercial nature on audiovisual broadcasts on cigarettes and othertobacco products are prohibited.[22]

Article 2 of the Regulation "On the Protection of Minors" of the Republic of Northern Macedonia defines harmful content as *programs that may adversely affect minors are the set of programs audiovisual or parts thereof which include descriptions, scenes, or images of violence, eroticism, prohibited sexual conduct, obscene (vulgar) words, suggestive forms of conduct, easy to imitate, and harmful to health, and security, conduct offensive to human dignity, etc.;*According to Article 8 of the "Regulation on the protection of children and juveniles from audio-visual media services", of the Republic of Kosovo, the term "programs with harmfulcontent" *refers to programs that negatively impair the physical, mental and moral development of children.*

a. Elements of harmful content

Defining the elements of harmful contentfacilitates the role of audiovisual media providers in respecting and protecting the right of children to access safe and appropriate information. The definition of each component constitutes an aspect of an administrative offense, which leadsto legal responsibility.

Violence, according to the Regulation "On the Protection of Minors", *is any clear reflection of*
any form of threat that can easily be carried out by physical force or direct use of violence, with or without weapons, the force that is intended to harm or scare one or more living beings.

In the same line, the "Regulation on the protection of children and minors from audio-visual media services", does not operate through

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[18] Article 42, Law "On the Audiovisual Media Authority".
[19] Article 33/e, Law "On the Audiovisual Media Authority".
[20] Article 46/ dh, Law "On the Audiovisual Media Authority".
[21] Article 42/ 8, Law "On the Audiovisual Media Authority".
[22] Article 42/ 4, Law "On the Audiovisual Media Authority".

abstract definitions, but explains in detail every element of sensitive content.For example*: "Unnecessary violence" means the intentional use of physical, mechanical, or other force to injure, injure or ill-treat.*[23]

The word "fear" refers to the emotion, often powerful, that is driven by the anticipation of danger, evil, and pain, regardless of whether the threat is real or imaginary.[24]

Also Article 2, para. 6 and 7,define the terms "erotic content"[25] and "pornography"[26].

The range of elements is expanded in the "Regulation on the protection of minors which", where in addition to the abovementioned elements, are included also:

- Use of drugs, psychoactive substances, cigarettes, and alcohol, in audiovisual programsthat is broadcast mainly to minors.[27]

-Excessive use of inappropriate expressions and gestures in programs dedicated to the whole family.[28]

- Contact programs, interactive with fortune-tellers (tarot, astrology, fortune tellers, and similar methods) that directly suggest changes in personal behavior, should be marked as programs that are not recommended for persons under 18 years of age. An exception is adaily horoscope classified as a program with an entertainment function.[29]

-Hypnosis techniques.[30]

-Special protection is guaranteed to people who suffer from photosensitive epilepsy. Audiovisual media service providers are obliged to publish on the screen the warning that there is a flickering light in the program.[31]

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[23]Article 2/ 4.
[24]Article 2/5.
[25]The term "erotic content" refers to program materials that focus on sexual desire and that represent certain erogenous zones of the human body and the final goal for sexual intercourse, but do not represent persons clearly during sexual intercourse.
[26]The term "pornography" refers to programmatic materials which clearly and openly represent the sexual organs or acts of a person.
[27]Article 4.
[28] Article 7.
[29]Article 9.
[30]Article 10.
[31]Article 11.

-Simulated news that is part of any entertainment, artistic, documentary, or another program, is prohibited from being reflected in a way that will encourage viewers to think that what they
see is news or information about something that happened.[32]
The programsmentioned in the regulation of Kosovo, para.8, include but are not limitedto the following contents:
- Contents with physical, verbal, gestural, emotional, and sexual, obtained through special effects.[33]
-Contents with sex scenes can be reflected in the framework of scientific, educational, documentary, or informative programs. These content scenes with such sexual performances as exhibitionism, nudism, sexual violence, and gender discrimination should be avoided. Such content is evaluated based on the purpose of each sex scene, assessing the relevance ofthe age of the viewers.[34]
- gambling, futureforecasting, reading letters, and psychic services programsthat have not been scientifically proven.[35]
In the Regulatory Code "On Audiovisual Content" of the Romanian state, in addition to elements such as violence, scenes containing prohibited sexual behavior, or the use of alcoholic beverages or narcotics, the concept of harmful content includes[36] persons in degrading hypostases, even though they may have given their consent[37]
- matches (duels) not regulated by national or international sports federations[38]

b. Categorization of programs and broadcast schedules
Categorization, followed by the selection of the broadcast schedule,filters out the elements of harmful content. Intervals are the fixed time of the program during a day within which the broadcasting of programs of a certain category is allowed. For each program category, there is a separate period for broadcasting.[39]

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[32]Article 12.
[33]Article 8/1
[34]Article 8/2
[35]Article 8/3
[36]See Articles 15,16,17.
[37]Article 18/ c.
[38] Article 18/ d.
[39]Article 1, Regulation of Northern Macedonia.

Perhaps, this process should be based on psychological expertise, to decide whetheror not a program affects the individual development of children. Categorization is absentin

the AMA Broadcasting Code, unlike other Codes / Regulations. According to them, television programs are categorized into:

Article 1, code of Northern Macedonia

- Programs are accessible to all categories of the public and can be broadcasted at any time.[40]

-Their other categories vary depending on the age of the children and this definition varies from state to state. For example, according to Article 21 / b of the Romanian Code, programs that can be attended by minors under age 12, but under the supervision of a parent or guardian, must be broadcasted after 20:00, while according to Article 21 / c between 23: 00 to 06: 00,programs for the under 15 age group should be attended in the presence of parents.

Article 16 of the Regulation of Northern Macedonia, lists programs that are not recommended for children under the age of 8, where the supervision of a parent or guardian is recommended; which can be broadcast throughout the day. Another category is programs that are not recommended to be attended by children under the age of 12 and 16 without the presence of parents. The first is broadcast from 20:00 to 05:00, while the second is from 22:00 to 05:00.

According to Articles 5 and 6 of the regulation of Kosovo "*programs are not recommended for children under the age of 10 and the presence of a parent or guardian is necessary.*

The broadcasting time is 15:00 until 06:00. Harmful program content that is not recommended for children under the age of 14 will be broadcast from 22:00 until 06:00. The presence of a parent or guardian is necessary."

Any television program considered harmful to children, mandatory to be broadcasted at an appropriate schedule should also clarify the elements of harmful content, eg: Programs, with unnecessary violence, fear as well as pornographic content and gambling, foresight, reading letters, psychic servicesprogramsthat have not been scientifically proven, are not recommended for persons under 18 years of age. The broadcasting of programs with constant violence and fear should be warned and accompanied by the appropriate sign. Whereas, programs

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[40] Article 21, article 16, article 5

with pornographic content can only be broadcasted in encrypted form.[41]

According to Article 15/1, *it is forbidden to broadcast in the interval 6:00 - 20:00 audiovisual programs realized in the studio or performed directly in which smoking, consuming alcoholic beverages, or displaying vulgar, inappropriate, shameful behavior.*

Article 17 paragraph 3 stipulates that for programs that are not recommended for children under the age of 12, parental or guardian supervision is recommended. There are programs whose script contains descriptions, scenes, and/or images of systematic or frequent psychophysical violence that may disturb minors. No excessive emphasis should be placed on weapons and techniques of interpersonal confrontation that can easily be imitated, with dangerous potential, that suggestively affects the less stable psychological and those that are emotionally aware.

The categorization of programs according to the content is missing in the AMA Broadcasting Code. This lack raises the necessity of this act revision, to improve and eliminate gaps that may lead to problems, in terms of protecting children from television programs.

Regarding broadcasting schedules, the AMA Broadcasting Code provides that between 19.00 to 22.00, it is mandatory to use warning signs for programs that impair children.[42] The 22.00-06.00 is the time limit where is necessary to take any other technical measures so that children do not watch or hear broadcasting programs that may impairthe mental, physical or moral development of children.[43]

The responsibility and freedom of selection and classification of programming and broadcasting in the respective schedules according to the Broadcasting Code belongs to the audiovisual media. So the responsibility is editorial. But naturally, the question arises: On what criteria are they based?

The lack of criteria is evidenced in this code.Some of the proposed criteria can be found in the regulations of the state of Romania and Northern Macedonia.

According to the "Regulatory Code for Audiovisual Content", Article 19, paragraph 1, the criteria based on which the programs are classified

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[41]Article 5/ 4 regulation of the state of Kosovo.
[42]AMA Broadcasting Code, point 5.44
[43]AMA Broadcasting Code, point 5.34.

are intended to ensure the protection of minors and inform the public about their content. Some of the criteria are provided in the second paragraph of this article, e.g.: the number and nature of violent scenes, as well as their necessary or unnecessary character, the type, and subject of the program; the way of dealing with images of scenes of violence, the type of plan used, the reality of the presentation (as close to reality), the role of the soundtrack to cause fear or anxiety; the context in whichdrug and alcohol consumption occurs; number and nature of nude scenes, presentation of the sexual act; number and intensity of scenes of domestic violence, etc.

In the Regulation "On the Protection of Minors" according to Article 14, the criteria are:

Number (frequency) and nature of descriptions, scenes with violence, erotic, sexual behavior prohibited by law, obscene speech (vulgar), suggestive behaviors that are easily imitated, while being harmful to health and safety, offensive to human dignity, etc.

"Censorship" of Japanese animated cartoons

The case of Dynamic Medien Vertriebs GmbH v. Avides Media AG[44] dealt with the issue of online circulation and postal distribution of Japanese animated films on DVD and videocassette, from one EU Member State to one another. A German media company (Dynamic Medien) sued another German company (Avides Media), for banning the sale of Japanese "Anime" (Japanese animated films on DVD or Videocassettes) imported from the United Kingdom and approved for children over 15 years of age, but not controlled and classified by a German authority.

The European Court of Justice assumed that the protection of children constitutes a legitimate interest that justifies a restriction on fundamental freedom guaranteed by the European Union Treaty, such as the free movement of goods "[45]

Explicitly, the court stated that "the prohibition of the sale and mail order of image storage media, which have not been examined and classified by the competent authority to protect young people and which do not bear a label from the authority that indicates the age, can

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[44]European Court of Justice - C 244/06
[45] Para.42.

be considered as an appropriate measure to protect children from information and materials that are detrimental to their well-being ."[46] So the need to protect young people is a reasonable justification for banning email orders.[47]

Furthermore, the Court notes that the protection of minors constitutes an important aspect of the protection of morals, public order, and health.[48]

Exposure of minors to images inappropriate for them such as violence, sex, and vulgarity can be considered by any state morally unacceptable or dangerous because of the copycat effect that, may be dangerous for the physical or psychological development of young people.[49]

The level of protection depends in particular on the cultural and moral concepts of each state as well as its history. Therefore, what is considered acceptable in one Member State for a certain group of young people may be considered unacceptable in the same group in another Member State.[50]

Even the "Convention on the Rights of the Child" does not set a unified standard regarding theprotection of children from harmful content, which affects the physical, mental or moral development of children, but delegates responsibility to states. Specifically, under Article 17, paragraph e, Member States shall encourage the elaboration of the necessary guidelines for the protection of the child against information and materials which are detrimental to his or her well-being. States are thus charged with a positive obligation to take the necessary measures to effectively guarantee the protection of children from access to harmful content, in particular those served by audiovisual media.

Let's see specifically how it has been handled the broadcast of Japanese anime on television.Purposely, we have referred to the phenomenon of animated cartoons.

Despite being considered an exclusive product for children'saudiences, they have provoked public reaction and quite strong social discourse. The sharpness of the themes and social or human dramas experienced by the characters required a level of maturity that did not match that of

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[46] Para.47
[47] Judgment - C 244/06,14 February 2008.
[48]Ibid.,
[49]Ibid.,
[50] Para.44.

the children, in the perception and understanding of messages. So it was necessary to apply somekind of control content through audiovisual media. The control was escalated taking the form ofcensorship.[51]

The intervention started with the change of the age of the characters by, increasing several years, as well as changing the educational level.[52]

Concretely, what are the elements of inappropriate content of these programs broadcast in Italy, from the perspective of the Italian state?First, the sequences with sex scenes and nudity are cut to not be broadcasted.[53]

Violent scenes, which lead to murder or grievous bodily harm, accompanied by the appearanceof blood, have been transmitted by changing the color of blood through technology. So changing the color red to a darker color or using negative effects.[54]

Terms that carried considerable emotional weight for the child audience were replaced with milder synonyms such as death-elimination, disappearance, out-of-play, etc.[55]

Dialogues that contained inappropriate vocabulary were cut, replaced, or modified.[56]

The inappropriate or exaggerated vocabulary contains a lack of sensitivity and understanding of the age and vulnerability of children.[57]

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[51]For more information read:
https://it.wikipedia.org/wiki/Adattamento_e_censura_degli_anime
[52]This is because characters get involved in love relationships and find themselves in situations of difficulty and maturity related to the adult world, to address an audience of teenagers. CavalieridelloZodiaco (The Knights of Zodiaco), Japanese age 13-15, Italian version 18 years.
https: //it.wikipedia.org/w iki / Adattamento_e_censura_degli_anime
[53] Dragon Ball, Georgie, E quasi magiaJohnyetj.
https://it.wikipedia.org/wiki/Adattamento_e_censura_degli_anime
[54]Changing the color of blood in the dark One Piece and scenes with negative effects Naruto, the use of technology to change the color of blood.
https://it.wikipedia.org/wiki/Adattamento_e_censura_degli_anime
[55]Dragon Ball, Lady Oscar.
https://it.wikipedia.org/wiki/Adattamento_e_censura_degli_anime
[56] In the cartoon series Cavalieri DelloZodiaco, reflective dialogues are added even when the characters are silent, while in Dragon Ball Z, the narrator's voice is added at the beginning and end of the episode.
https://it.wikipedia.org/wiki/Adattamento_e_censura_degli_anime
[57] The KULIŚ and RÓŻYCKI Case k. POLONISW, Application no. 27209/03, Judgment dated 06.10.2009.

Restrictions have not escaped even three Disney classics, Dumbo, Peter Pan, and Aristocratic Cats for children up to 7 years because they risk giving dangerous and racist messages. The films were canceled by the Disney + Channel dedicated to children, but can be viewed by adults bylabeling "programs with negative content that denigrate populations and cultures".[58]

According to the decision of the Supreme Administrative Court of the Czech Republic on 15 May 2008, television programs with scenes involving violence, alcohol, cigarettes, and sexual content threaten to endanger the physical, mental or moral development of children and can reasonably be banned from being broadcast at a time when children are most likely to be awake. Here, there is no need to prove that children have been negatively affected by this program I special; it is sufficient to know that the program might have jeopardized their development.[59]

Conclusions and recommendations

Exposure of minors to the diversity of television programs is an emergency that calls into question the effective implementation of the fundamental rights and freedoms ofchildren. Access to harmful content of certain programs, served by audiovisual media dictates the need to develop a public discourse.

In Albania, this issue is still not sensitive. The issue goes beyond the scope of the legal debate, aiming to develop a public debate, where civil society actors, social workers, or psychologists interact to fulfill a social mission: the protection of the right of children to receive sound information, which serves to foster their critical skills. So one has to judge the usefulness of certain television programs, broadcast

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[58] Dumbo: the verses of a song about African slaves denigrating this race. Peter Pan denigrated indigenous Americans as "red-skinned." Aristocratic cats are guilty of insulting Asian people.
https://variety.com/2021/digital/news/disney-plus-blocks-racist-films-kid-profiles1234927194/
[59]http://www.nssoud.cz/files/SOUDNI_VYKON/2007/0070_6As__0700104A_prev edeno.pdf
Translation and summary provided by Children Rights International Network:
https://archive.crin.org / en / library / legal-database / fines-broadcasters-realitytelevision-show-which-containednumber-scenes.html

schedules, and the consequences that can bring on the physical, mental and moral development of children, to provide a legal solution.

Thus, we recommend the revision of the AMA Broadcasting Code, regarding the categorization of programs based on their content, the resolution of the broadcasting schedule taking into account the elements of television programs unsuitable for children, as well as the definition of criteria based on which their selection is made.

The lack of attention to the above elements, questions the protection of children's access to dangerous information for the physical, psychological, and moral development of children, reflected on television screens.

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APPLIED SCIENCES

SHKENCA TË APLIKUARA

PROPOSED RESOURCES MANAGEMENT SYSTEM FOR APIARY PRACTICES

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Abstract

This paper presents a new Resources Management system for the apiary. The proposed system is called Bee Quality Resources Management System (BeeQ RMS). It has been designed based on beekeepers' requirements and monitoring beekeeping practices at the University of Ioannina beekeeping station. The system architecture includes the BeeQ RMS database, BeeQ resources management Web application, mobile phone application, and service for collecting field beehive measurements from sensors over the MQTT protocol. This paper presents the Web application and the mobile application capabilities and functionality of the BeeQ RMS system and the dashboard for real-time sensory measurements acquisition.

The proposed BeeQ RMS Web capabilities include monitoring beekeeping treatments, detecting illnesses, feeding, weight measurements, queen detection or loss, bee-swarming, or other interventions that need periodic monitoring and control. The proposed BeeQ RMS mobile application capabilities include real-time feeding practices monitoring, disease treatments recording, and sensory monitoring. The system also consists of a mobile application for beehives QR scanning using 2D or 3D printed QR codes and showing in real-time the last performed feeding treatments or status of the selected beehives.

Introduction

Most beekeeping practices are time-consuming, complex, and risky activities that do not always achieve the desired results. The reason for this is the difficulty of beekeepers to keep track or remember their interventions per beehive, especially when they are amateurs. Furthermore, several diseases are pretty hard to detect on time by observing a beehive, which can lead to the complete colony collapse disorder.

As mentioned in [4], the main objectives for successful beehive management are: a) To identify the factors at the individual colony levels providing well-being and identify threats and b) to investigate synergistic effects to boost or lessen them accordingly.

Focusing on these objectives, the authors present their approach of a holistic management system for the apiary that extends from recording the field practices to using sensors and for the early detection of issues. The authors have implemented a

Resources Management System called BeeQuality RMS (BeeQ RMS) to this extent.

Their proposition consists of a Web application that concedes the information beekeepers need to know and collect by observing their hives. Additionally, the BeeQ RMS mobile application allows checking that information by scanning the, on top of the hives placed, QR codes. Both Web and mobile applications functionality are analyzed in the following sections. The Web app, the mobile phone application, and the sensory service, scripts, and databases behind them constitute the entire system's logic. Therefore, this paper is divided into the following sections. Section 3 presents the related work

on existing Resource management systems for the apiary. Section 4 describes the BeeQ RMS high-level architecture and components. Section 5 describes the system's capabilities as identified by the end-users and the system's preliminary tests performed. Finally, section 6 concludes the paper.

Related work

The purpose of the BeeQ RMS system was to make one more step forward in the field of management systems for apiary practices, based on the work that has already been done. The starting idea was a real-time monitoring system that would provide the complete observation for the dominating situation of the colony, depending on the hive's weight and the traffic inside the hive. The importance of a Resources Management system is based on the practical need for some quality control and the issue of treatments notifications when something is sensed or recorded as problematic [8].

Taking this thought one step further, the need for sensory measurements has emerged. To this extent, a new sensory service has been created that collects measurements such as the weight, the internal humidity, the internal frame and the upper-lid temperature, andsound intensity from the beehives. All those measurements are stored in the system's database.

All of the above measurements can be helpful to understand many aspects of the colony because those parameters' threshold values are illustrative of the beehive's health and productivity [3]. Those measurements are taken with the help of cheap sensors that are implemented inside its hive. The measurement data are sent in realtime to the BeeQ-RMS data-log service, sing the MQTT [6] application protocol over Wi-Fi or LTE networks.

The beehives include low price and low energy consumption microprocessors to record internal conditions and to endure different external weather parameters [1]. Threshold values are used to indicate excessive parameter values of weight, humidity, temperature.

A vital parameter to observe and monitor in a beehive is sound intensity. Some of the most critical illnesses of a hive or attacks is the sound. Studies have shown that bee sounds can be translated into signals that can prevent some events such as swarming. The specific detection happens effortlessly. The system first filters and then

calculates the recorded sound's enveloped; if the signal's amplitude rises quickly, there is a notification for a possible swarming event [9]. Furthermore, camera modules inside the hive can detect bee swarming [10] or other diseases such as the Varroa Mite. To the extent of population monitoring, authors at [2] placed capacitance-based sensors at the beehive doorways to detect bee movements or bee population variations.

BeeQ RMS high-level system architecture

BeeQ Resources Management system (BeeQ RMS) is a cloud-based system that receives and sends data delivered either by the end-users or sensors to the system's datalog engine. Website and the mobile phone application are used to this extent for illustration, data logging, and the issue of thresholds biased notifications. BeeQ RMS high-level system architecture is presented in Figure 1.
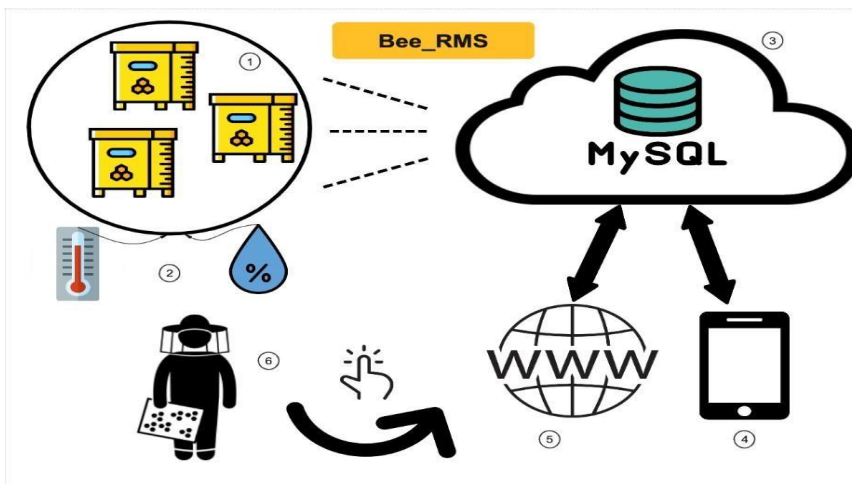
Figure 1. BeeQ RMS high-level system architecture including database service, sensory service collecting measurements over Wi-Fi or LTE, Web and mobile phone applications.

The core components of the authors' proposed BeeQ RMS system are described in the following subsections.

BeeQ RMS Database and Database logging service

The BeeQ RMS storage engine is divided into three sectors. The first one is filled with the authentication details for administrators and users, such as username, password, and every user's unique id. Then the second database in our system includes the data needed for the feeding and disease monitoring (both will be presented in the following section). The second database is connected bidirectionally to the Website and the application because there are multiple changes made every day, always based on the progress of the technique applied. Last but not least, the third database in the cloud includes the real-time measurement, which is sent to the system from the sensors inside and outside of the hives. The third database is the only one that cannot be changed manually from the user through the Website or the application.

BeeQ RMS has MySQL databases on the Linux platform, which are preferred to deploy cloud-native applications as it provides the appropriate speed and functionality. In addition, the usage of MySQL has no upfront costs, and all utilized software is open, either open source or free [5].

BeeQ RMS Website

As explained above, all three databases are sending data to the Bee_RMS website and application, with two of them not only sending but receiving data too. The Website of BeeQ RMS is written using jQuery and Bootstrap to customize the Website while being connected with PHP scripts running to the system (Sensors).

BeeQ mobile phone Application

Similar to the website's architecture, there are PHP interfaces written for the android part of RMS. Furthermore, the designing part is written in Java with XML files. Both are performed in the Android Studio platform. The capabilities of the Bee_RMS will be presented in the next section.

BeeQ RMS sensory service

BeeQ RMS architecture contains beehives with embedded sensors that can send data in real-time to the cloud (BeeQ RMS MySQL Database service). The beehives are designed based on creating a holistic condition monitoring beehive [1] , which aims to use efficient

technology and low power communication protocols to provide quality monitoring and safe management of apiary practices [7].

After the sensory data collection by the sensory service, the data measurements are presented to the apiarists either from the Bee-RMS website or the Android mobile phone application. Finally, the end-user beekeeper can monitor either the last received sensory measures or receive notifications of sensory biases.

It is set as future work the implementation of a sensory manager for the BeeQ Web application, a history measures web and mobile phone interface, and a future trends service that will provide predictions based on existing sensory data acquisitions for sound, temperature, and humidity.

Proposed BeeQ RMS application's capabilities

The aim of the BeeQ project is to deskill the weekly and monthly processes of apiary. Especially, the beekeeper has the chance to change how to store data, because they used to save feed and check data manually on paper so far and now there is the ability to add the measurements either on website or in application. Also, there are more options which are explained below.

BeeQ RMS website capabilities

The Website consists of 6 pages. Firstly, the beekeeper must authenticate the personal login details (Username, Password) in order to access the system. This action takes place on the Login page. After that and if the beekeeper has access successfully to the system, the user is directed to the Website's main page, the Hives page.
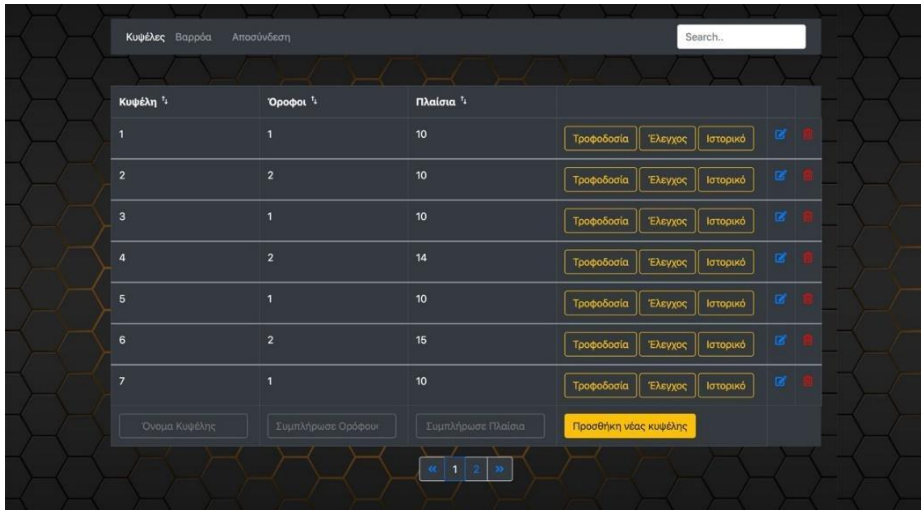
Figure 2. Beehives Manager interface

There is a navbar at the top of the site, which contains buttons for the
main page, the Varroa detection page, and the configuration options.
Also, the Search button gives the ability to search the specific hive in
the following table. The table in Figure 2 illustrates the hives and
provides the ability to change the data, especially the ability to add a
new hive by filling the beehive's name, number of floors, and number
of frames. Likewise, the user can save the data of his hives.

Furthermore, it provides an additional set of actions such as the Feed
action, the Check action, and the History action. In closing the report
of the Hives page, it is worth mentioning the Delete action, and the
Update action. The beekeepers can change the beehive's name and fill
out the beehive's new number of floors and the new number of frames
on this page. Assuming that all cases fill out correctly, the Submit
button is to save the changes; otherwise, if the instances fill out
incorrectly, the Reset button will delete them. There certainly is the
Back button, which can be clicked to go back to the Hives page. Now,
it is worth mentioning another three pages of the Website, the Feed
page, the Check page, and the History page.

The Feed page contains all actions, which take place in the hive's
measurement. More specifically, the user can fill out the following:
Brood Comb, Honey Frames, Quantity, Weight, Date Input, Next Date
Input, Extra Frames, Extra Floors, Remove Queen bee cells, and Extra

Info. The user can change the input before submission. For example, the user can schedule the feeding day, change the quantity of food bees must have, or update the weight of the whole hive. Following a successful submission, a second column Data is created, and the feed data contain the last input.

Based on the context, the Check page is more or less similar to the Feed page with a few differences. Feed page contains all actions which take place in the hive's checking for disease and disease treatments monitoring. Specifically, Date Check, Loss or Detection of the queen, Color, Age, Varroa, Date Cure of Varroa, Swarming, Date Cure of Swarming, Nosemiasi, Date Cure of Nosemiasi and Extra Info. Again, multiple changes can be done before the submit button is pressed. This time, the user has the ability to schedule his treatment techniques based on the already detected diseases.

Έλεγχος

Στοιχεία	Δεδομένα	Αλλαγή
Κυψέλη	1	-
Ημ/νία Ελέγχου	2021-10-01	25/10/2021
Απώλεια/Εντοπισμός Βασίλισσας	Εντοπισμός	● Απώλεια ○ Εντοπισμός
Χρώμα	μπλέ	όχι
Ηλικία	2	1
Εντοπισμός Βαρρόας	0	○ Καθόλου ● Λίγο ● Αρκετό ● Πολύ
Ημ/νία Θεραπείας	Καμία Θεραπεία	●Ημ/νία Θεραπείας: ○Καμία Θεραπεία
Εντοπισμός Σμηνουργίας	0	○ Καθόλου ● Λίγο ● Αρκετό ● Πολύ
Ημ/νία Θεραπείας	Καμία Θεραπεία	●Ημ/νία Θεραπείας: ○Καμία Θεραπεία
Εντοπισμός Νοζεμίασης	0	○ Καθόλου ● Λίγο ● Αρκετό ● Πολύ
Ημ/νία Θεραπείας	Καμία Θεραπεία	●Ημ/νία Θεραπείας: ○Καμία Θεραπεία
Βάζει Μέλια	1	○ Λίγο ● Αρκετό ● Πολύ
Λοιπές Παρατηρήσεις		

Υποβολή

Figure 2.1 Check Page

Τροφοδοσία

Στοιχεία	Δεδομένα	Αλλαγή
Κυψέλη	1	-
Όροφοι	1	1
Πλαίσια	10	10
Πλαίσια Γόνου	3	3
Πλαίσια Μελιού	4.5	4,5
Ποσότητα Τροφής (kg)	0 kg	0
Βάρος (kg)	0 kg	0
Ημ/νία Τροφοδοσίας	2021-09-01	25/10/2021
Επόμενη Τροφοδοσία	2021-09-01	09/11/2021
+/- Ορόφων	0	0
+/- Πλαισίων	0	0
Αφαίρεση Βασιλικών Κελιών	Όχι	● Ναι ○ Όχι
Λοιπές Ενέργειες		

Υποβολή

Figure 2.2 Feed Page

For example, the system has detected a hive suffering from Varroa, so it is suggested that the user apply the appropriate treatment as fast as possible. By pressing the button Submit, the second column Data is created. The Data contains the last submission that the user has made.

Finally, the history page exists, which includes all the submitted changes. The History page shows the completed submissions both for the Feed and Check pages, for each hive accordingly. This capability can offer complete actions observations to the beekeepers, which could be extremely helpful in cases where more than one person takes care of the beehives.

BeeQ RMS mobile phone application capabilities
A Bee_RMS application corresponding to that of the Bee_RMS website has been created. Anyone can download this application from the Google Play Store. There are many fragments in the app, which are be described below.

The first fragment that appears when the user opens the app is the Login page. This page contains two boxes of username and password input. Also, authenticate the user details, especially if the user enters the name and password incorrectly, a message 'wrong name or password' will be appeared. Otherwise, if the user enters the correct details, the second fragment will show up.

The second fragment is the application's main page and contains two ways to search the hive's data. Either the QR-code way, which is required to scan the hive's QRcode, or the manual method, which is necessary to enter the hive's number into the 'Search' box, and if the Submit button is clicked, the third fragment will appear. Also, there is the Hives list button that displays a bunch of hives. Each one contains and prints out the following: date, indoor temperatures, outside temperatures, indoor humidity, and sound.
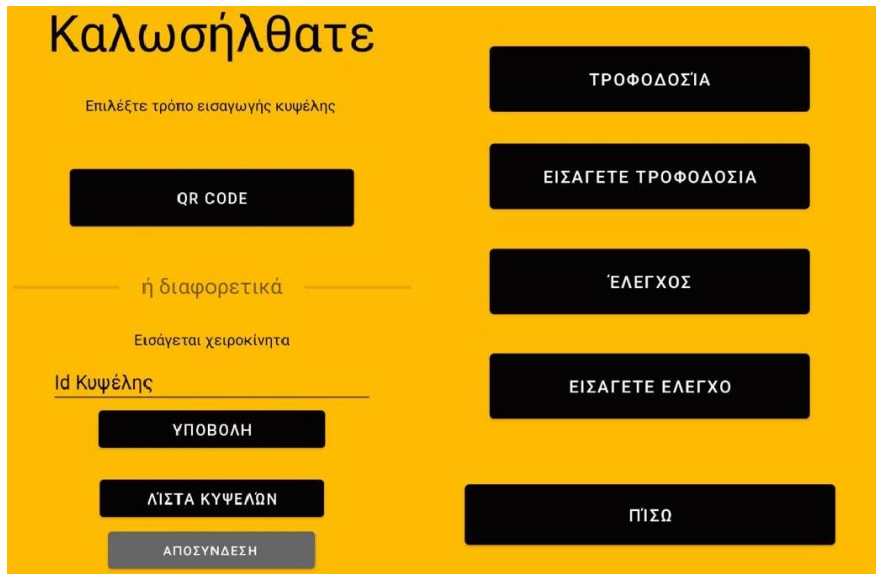
Figure 3.1 Second Fragment   **Figure 3.2 Third Fragment**

The third fragment includes four options for each hive, which has been selected from the previous fragment. The options are the Feed button, the Insert Feed button, the Check button, and the Insert Check button, each of these leads to the following pages. The Feed page contains all actions, which take place in the last hive's measurement. Especially the Brood Comb, the Honey Frames, the Quantity, the Weight, the Date Input, the Next Date Input, Extra Frames, Extra Floors, the Remove Queen bee cells, and Extra Info. Also, there is the Insert Feed button, which is for saving the hive's measurement data.

Figure 3.3 Feed Fragment. **Figure 3.4 Check Fragment**

On the other hand, the Check page contains all actions, which take place in the last hive's checking for disease and disease treatments monitoring. Specifically, the Date Check, the Loss or Detection of the queen, the Color, the Age, the Varroa, the
Date Cure of Varroa, the Swarming, the Date Cure of Swarming, the Nosemiasi, the Date Cure of Nosemiasi and Extra Info. In addition, it is worth noting that there is the
Back button to return to the previous fragment on each fragment. Furthermore, there is the Insert Check button, which is for saving the hive's checking data. Finally, the Back button leads the user to the previous fragment, the second fragment.

Preliminary Tests of BeeQ RMS applications functionality
The tests were in the form of single test cases intended for manual execution and manual recording of the results. These were designed to prove the compliance of the developed application with the functional, technical, and performance specifications and to demonstrate to the users that the system satisfies the original requirements. The acceptance testing focused on user-driven testing, using business scenarios to simulate real-world activities. In acceptance testing might

have been used real users where possible. Any failures of the Bee_RMS system during the test execution implied the collapse of the whole test, so the failure was fixed and the test repeated.

The best mechanism to analyze the test results in this project was through a visual inspection. Therefore, the tester avoided using computer programs to perform this process. However, a test scenario couldn't be avoided using an automated test. For the functionality of the database that has been used in the system, the tester designed a test written in PHP to see if the database will effectively manage a considerable number of users at the same time. Besides this, the tester was responsible for executing the tests but also for analyzing them. In this way, he was entirely responsible for evaluating the system's execution flow. Through the use of this technique, it is possible to obtain greater control over the flow of tests. If the flow of tests were controlled only by automatic tests, perhaps the unexpected situation could go unnoticed, which could cause severe failures in the future.

Conclusions and future work

To summarize, Bee_RMS is meant to become an essential tool for beekeepers in the future. By gathering all the information users need to know about their hives, avoiding any mistake that may have happened due to lack of attention can easily be prevented. Also, keep in mind that all these capabilities are provided both on the web and smartphones in order for users to have access from everywhere they want.

Bee_RMS is expanding, trying to solve by early notifying the beekeepers for the disease of Varroa. As said above, the ability to check the date of detection and cure already exists. In order to notify the user of Bee_RMS before the disease of Varroa harms the whole beehive. There are some micro cameras implemented inside it, and through image processing and the help of some algorithms, Bee_RMS will soon be able to launch a new version with notifications whenever Varroa starts to expand.

Finally, an Augment Reality fragment is added to the Bee_RMS application to provide a more realistic perspective of the beehive to the user while accessing it through his mobile device. As a result, users will be able to check real-time measurement and at the same time experience the capability of AR.

There is still a lot of work to be done in the field of management systems on beekeeping, and the most important way to evolve applications like Bee_RMS is through the contribution of the beekeepers. Beekeepers can provide pretty important information on the problems and possible solutions to them in apiculture. According to the above and adding the new features that come soon in the application, Bee_RMS will become an effective tool for the resources management system for the apiary.

Currently, it is being tried to diminish the diseases between bees, a fact that will seem extremely useful for beekeepers. Multiple algorithms and training methods are being tested all this time in order to select the most efficient way to prevent diseases like Varroa, Swarming, and Nosemiasi. Most of them are based on digital signal processing and, more specifically, digital image processing. The whole idea is based on "translating" the manual way beekeepers check and deal with the up-and-coming diseases in every beehive into an algorithm.

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INTERNET OF THINGS AND CYBERSECURITY

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Abstract
The Internet has become a vital part of our lives and our society is becoming more connected than we have ever been before with technology advancing every day. As the number of Internet-connected devices is increasing every day, it is observed that the number of threats against IoT devices and services is also increasing. Cyber-attacks are not new to IoT and along with the growing number of cyber-attacks, cybersecurity has become one of the most important areas of the Internet of Things (IoT). The contemplate of IoT is to lower the risk of cybersecurity for users and organizations by protecting IoT assets and privacy. This paper is an attempt to address security challenges in the Internet of Things (IoT), classify threat types, and analyze attacks facing IoT services and devices.
Keywords: Cyber-attacks, security challenges, cybersecurity, internet of things (IoT).

1. Introduction

Nowadays, technology is changing quickly and affects our lives in many different ways. The internet is widely available everywhere and you can use it on various devices like computers, laptops, smartphones, etc.

IoT applications have significantly increased in both popularity and usage during the past few years. Applications of many different domains have been introduced to the market, including traffic control, home automation, transportation management, manufacturing management, environmental monitoring, etc. In different applications, IoT actively uses sensors, actuators, gateways, circuits, and other hardware which communicate with each other through communication technologies(wired/wireless) known as IoT devices. There are various communication technologies, such include Wi-Fi, Ethernet cables, WiMAX, RFID, mobile communication technology, and other ways that connect everything. This depends on existing infrastructure

whether it is wired or wireless infrastructure and there are different protocols including multicast domain name system, XMPP, the constrained application protocol, IPv6, IPv4, HTTP, and many more used at different layers. Security becomes extremely important when these devices are near us and transmit data over the network. IoT gadgets are frequently employed in industries as well. It is essential to take into account the risk of cyber vulnerabilities & attacks in the IoT environment to partially protect it.

The International Telecommunication Union (ITU) defines cybersecurity as "the collection of security principles, protection, guidelines, change management processes, actions, education, practices, guarantee, and technology that may be used to protect the cyber environment, organizations, and people's property." On the other hand, the Internet of Things is a vast system with self-organizing capabilities given standard and interoperable conventions and configurations consisting of heterogeneous things with characters, and physical and virtual traits, and is flawlessly and safely integrated into the Internet, according to IoT-SRA.

2. Introduction to the Internet of Thingsand Cybersecurity

IoT was defined in a variety of ways by numerous people and groups. The idea of IoT is not new. Machine-to-Machine communications marked the beginning of the IoT era (M2M). The term "machine-to-machine," or M2M, was previously used to describe communications between devices through any type of network, including wired and wireless ones. However, in modern usage, it most often refers to cellular or satellite networks. Another name for it is Sensor Network. These IoT objects (cloud/web server/node/sensor/machine/app) have direct connectivity to the internet and convey their data via the internet to other objects. Since all of these IoT objects are regarded to be Things, the term "the Internet of Things" refers to this network of connected devices.

Things are primarily classified as virtual and physical objects in the information realm. Things can communicate with one another over a communication layer and have distinct identities. The surrounding environment, sensors, electrical and electronic devices, actuators, etc. are examples of physical things, whereas virtual things, such as IoT

applications (web/mobile apps), Twitter, Facebook, Thingspeak, Blynk, etc., can be stored, processed, and retrieved. Therefore, the Internet of Things (IoT) is a network of interconnected physical and virtual objects (devices, cars, buildings, and other items with electronics, software, sensors, network connectivity, etc.) that enables these objects to gather and exchange data.As a result, IoT is the environment that uses various communication technologies to link people, processes, and physical or virtual objects (sensors) together. Many more people can engage by using IoT web and mobile applications, such as CRM systems, remote monitoring, maintenance, supply chain management, and location tracking. In location tracking applications, GPS sensors periodically send their location data to a configured server, where it is processed and stored in a database. Mobile applications and web apps then offer a user interface through which users can access this data and take the appropriate actions or decisions based on the needs of the application.

Cybersecurity is a set of methods intended to protect a user's or organization's online environment. These methods are typically described in published sources. It oversees the tools used to protect networks, programs, and data integrity against illegal access. Cybersecurity is also referred to as information technology security.Security in the context of computing includes both physical security and cyber security, which are both implemented by businesses to protect against unwanted access to the data center and other computerized systems. Security is a part of cyber security and is intended to preserve data's confidentiality, integrity, and availability. The scope of cyber security operations includes defending systems and information from serious online threats. Numerous threats exist now. Consequently, keeping up with cyber security operations and strategy can be difficult, especially in government and enterprise networks where, in their most inventive forms, cyber attacks frequently target the sensitive political and military assets of a country or its citizens.

3. Security Challenges and Cyberattacks in the Internet of Things

New security threats and difficulties are emerging across all industries as a result of the IoT's explosive expansion.IoT will alter how businesses operate and how customers interact with the world. A huge

cybersecurity concern is information sharing with everything. Malicious attacks will rise when billion IoT devices link to other networks. IoT devices can be used as a portal by cybercriminals to access corporate networks and cloud environments. IoT implementation faces its biggest challenge in terms of cybersecurity. On connected devices, such as the potential to hack connected vehicles, cyberattacks have already begun. Customers now understand that their information can be used to analyze their choices, and they have begun to consider who has access to and is responsible for protecting their data.There will be a battle for competitive intelligence when various systems interact. Because it will produce new cybersecurity issues, which will increase the value of the security. Additionally, data security is a key issue for IoT devices and needs to be addressed. Data breaches are a daily topic of news. Every connected object produces data, and the amount of data produced is measured in zeta bytes. These delicate data are accessible to malicious attackers. Take thermostat data as an example; it may be used to determine the total number of people and their availability. Your location and availability at a certain location can be tracked using GPS.Although it doesn't seem like much, this information is sufficient for criminals to exploit it against anyone. Business data can be used similarly. Today, several businesses, including Google, Yahoo, Facebook, etc., collect social data, which hackers can access. Yahoo acknowledged the compromise of 1 billion accounts on December 14th, 2016. Manufacturers of IoT devices must comprehend that data privacy starts at the source. No unprotected information should ever leave the sensor. Before transferring data to the cloud for processing and storage, it must be encrypted.To solve security issues, the system assets (system components) that comprise the IoT must first be identified. Understanding the asset inventory, which includes all IoT components, devices, and services, is crucial. An asset is a financial resource, something priceless and delicate that belongs to an organization. The system hardware of any IoT system is its key asset (which may include structures, equipment, etc.)

3.1 Vulnerabilities
Vulnerabilities are weaknesses in a system's operation or architecture that allow unauthorized access to sensitive information, program execution, and denial-of-service attacks. Vulnerabilities in IoT systems

can be found in many different places. They could consist of, but not be limited to, errors in the system's software or hardware, its policies, and the users themselves.The two main components of IoT systems, system hardware, and system software, usually have design flaws. Due to hardware's compatibility and interoperability, as well as the time and effort needed to address them, hardware vulnerabilities are exceedingly difficult to find and even more difficult to fix once they have been found.Operating systems, application software, and control software such as communication protocols and device drivers all have security flaws.Two of the many possible reasons why software design flaws occur are human factors and program complexity. Technical vulnerabilities are generally caused by human inadequacies. Insufficient developer-to-user communication, a lack of resources, skills, and knowledge, as well as the inability to administer and govern the system, can all emerge from a lack of comprehension of the specifications.

3.2 Exposure

One of the most challenging issues with the Internet of Things is resilience against exposure to physical dangers. An attacker can conduct information-gathering operations if the system has a configuration defect or error known as exposure.Devices may be left unattended and placed in locations where they are likely to be easily accessible to attackers in the majority of IoT applications. Due to this exposure, there is a higher chance that the device will be intercepted, its code altered, or it will be replaced by a malicious device under the attacker's control.

3.3 Threats

A threat is something that takes advantage of a system's security bugs and puts it in danger. The two main threat sources are people and the natural world.Earthquakes, hurricanes, floods, and fires are just a few examples of the severe damage that can occur to computer systems. Nobody can prevent natural catastrophes from occurring, and they are tough to prevent. Disaster recovery plans, backup plans, and contingency plans are the best ways to safeguard systems from natural risks.Human threats are those that are caused by people, like

malevolent threats that are either internal (someone who has access) or external (individuals or organizations operating outside the system) and want to harm or disrupt a system.The following categories apply to threats posed by people:

- Unstructured threats the majority of them come from novice users of readily accessible hacking tools.

- Structured threats happen because people are aware of system flaws and can comprehend, create, and use scripts and programs to their advantage. Advanced Persistent Threats (APT) are an illustration of a structured threat. APT is a sophisticated network attack used to steal data from high-value information held by businesses and governments, including those engaged in manufacturing, finance, and national defense.

3.3 Attacks

Attacks are actions taken to harm a system or disrupt normal operations by using various strategies and tools to take advantage of weaknesses.Attackers launch attacks to accomplish objectives, either for their gratification or to receive retribution. Attack costis a measurement of the effort that will be made by an attacker, represented in terms of their knowledge, resources, and motivation. Attack actors are those who pose a risk to the online environment. Hackers, fraudsters, or even governments could be among them. An attack can take many different forms and the most common forms of cyberattack include:

a) Physical attacks are attacks that interfere with hardware elements. The majority of IoT devices often operate in outdoor settings, which are extremely vulnerable to physical attacks because of the unattended and scattered nature of the IoT.

b) Reconnaissance attacks involve the illegal identification of systems, services, or vulnerabilities. Scanning network ports, using packet sniffers, traffic analysis, and sending requests for IP address information are a few examples of reconnaissance attacks.

c) Denial-of-service (DoS): This type of attack aims to prevent the intended users from accessing a system or network resource. The bulk of IoT devices is susceptible to resource

enervation attacks since they have minimal memory capacities and few computational resources.

d)   Access attacks happen when unauthorized users access networks or devices they are not permitted to access. There are two sorts of access attacks: The first is physical access, in which a hacker gains access to a real object. The second is that IP-connected devices are subjected to remote access.

e)   Attacks on privacy: Due to the vast amounts of information that are readily accessible through remote access mechanisms, privacy protection in IoT has grown to be more difficult. The most frequent breaches of user privacy involve:

  •   Data mining, which enables attackers to find information in specific databases that was not intended to be found.

  •   Cyber espionage: obtaining sensitive information about people, companies, or the government by employing malicious software and cracking techniques. Eavesdropping: hearing another person talk.

  •   Tracking: Using the device's distinctive identifying number, users' movements can be monitored (UID). When a user wants to remain anonymous, tracking their whereabouts makes it easier to identify them.

  •   Password-based attacks: There are two possible approaches to this endeavor:

      1.   A dictionary attack tries various letter and number combinations to guess user passwords;

      2.   A brute force attack uses password-cracking software to try every possible combination of passwords to find working passwords

f)   Cybercrimes: The Internet and smart things are exploited to steal intellectual property, identities, brands, and money. Cybercrimes also include fraud.

g)   Destructive attacks: Space is exploited to cause widespread disruption and property and human life loss.

Terrorism and retaliation are two examples of damaging attacks.

h) Attacks on supervisory control and data acquisition systems (SCADA) TheSCADA system is susceptible to numerous cyberattacks, just like any other TCP/IP system. Two primary methods of attack are possible:

    i.Shutting down the system using denial-of-service.
    ii.Taking over the system via Trojans or malware. For instance, a Stuxnet-based attack was conducted against the Natanz nuclear complex in Iran in 2008.

4. Threatsand Security Types in the Primary Tiers of IoT

The perception Layer, Network Layer, Middle-ware Layer, and Application Layer are the four primary tiers of the Internet of Things (IoT).

The perception layer is composed of several kinds of information sensors, including RFID, barcodes, and other sensor networks. The main function of this layer is to identify interesting items and manage the data it has collected from the outside world with the help of a separate sensor (s). Numerous threats, including unauthorized access to the Tags, are present in these sensors. Numerous systems lack the necessary validation tools, making tags accessible to individuals without permission. The attacker can't just read the data but the data can be changed or even removed. Due to the remote characteristics of RFID, it is easy for an attacker to sniff out private information like passwords or other data that leaks from tag to reader or reader to tag, rendering it unprotected because the attacker can exploit it in despicable ways. The IoT architecture's fundamental layer, the perception layer, provides many security highlights to the hardware. It satisfies four fundamental requirements: authentication, data privacy, sensitive information privacy, and risk assessment. Using Cryptographic Hash Algorithms, authentication is completed. These algorithms award advanced marks to the terminals that can withstand all conceivable known attacks, such as Side-channel attacks, Brute force attacks, Collision attacks, and so on. Data protection by using symmetric and hilter-kilter encryption techniques, such as RSA, DSA, BLOWFISH, and DES, among others, that prevent unauthorized access to the sensor data while it is being gathered or transferred to the

subsequent layer, ensuring the privacy of the data. They are simple to implement into the sensors due to their advantage of low power consumption. Risk evaluation is a crucial component of IoT security that identifies fresh threats to the system. It might assist in stopping security breaches and choosing the appropriate security measures. The Dynamical Risk Assessment approach for IoT is an example of it.

The network layer has the purpose to communicate the gathered data obtained from the perception layer to a particular data preparation system via the Internet, mobile networks, or other types of reliable networks. Under this layer, the related security issues, such as the Sybil Attack or Sinkhole Attack, are examined. Sybil is a type of attack where the attacker tricks the hub into acting in different ways for a single hub, endangering a large portion of the system and giving false information regarding redundancy. The Sinkhole is a type of attack where the enemy deceives the system into believing that the data has been obtained on the other side by making the bargained hub appear alluring to the nearby nodes. As a result, all data spilling out of one hub is redirected towards the bargained hub, causing bundles to drop. Additionally, this attack increases the amount of energy used, which increases the risk of a DoS attack. DoS (denial of service) attack is the attack type in which the attacker overwhelms the network with a pointless amount of activity, depleting the resources of the targeted system and making the network unreachable to users. Authentication and data privacy are further separated under the network layer security. Illegal access to the sensor nodes to spread false information could be prevented with the use of a suitable authentication method and point-to-point encryption. The most well-known type of assault is the denial-of-service (DoS) attack, which affects the network by sending a lot of pointless traffic its way via several botnets populated by the system of networked devices. To verify that the data obtained on the other side is identical to the original, data privacy measures, security monitoring tools, and data integrity techniques are all put into action.

Middle-ware Layer is the layer that consists of data preparation systems that automate tasks based on the outcomes of handled data and link the system to a database to give the obtained data storage capabilities. This layer's benefit arrangement ensures that the connected devices will have the same administrative structure. This layer, which provides distinct interfaces to the applications and data storerooms, is a potential

attack type. By restricting access to IoT-related services or by erasing the system's current data, an attacker might easily harm the system. DoS attack is a type of attack that shuts down the system, which makes the services unavailable, similar to the DoS attack discussed in the previous layers. Unsavory Insider is a type of attack that occurs when someone inside changes the data for their gain or the gain of any outsider. It is simple to segregate the data and then purposefully alter it from within.

The application layer is the layer that implements numerous practical IoT applications based on user requirements and diverse business models, such as Smart Home, Smart Environment, Smart Transportation, and Smart Hospital, among others.In this layer, several types of threats take place. Malicious Code Injection is that kind of threat where an attacker can inject any form of malicious code into the system using hacking techniques by using the at-attach system from the end clientto steal data from the client. Attack using denial-of-service (DoS). These days, DoS assaults are sophisticated. They use a smoke screen to launch attacks that compromise the client's data security while tricking the victim into thinking that the true attack is taking place somewhere else. This gives the programmer access to the client's non-encoded personal points of interest. The Sniffing Attack is another kind of threat that occurs by installing a sniffer application on the system where an attacker can force an attack and compromise the system by gaining access to network information.

5. Principles of privacy and security

We need to be aware of the significant security objectives if we're going to execute effective IoT security. Some of the most significant security goals are confidentiality and integrity, authentication and authorization, availability, accountability, and privacy goals.

Confidentiality is a crucial IoT security aspect but in cases where data is made publicly available, it may not be required. However, sensitive information must generally not be shared with or read by unauthorized parties. For example, patient data, confidential company information, military information, security credentials, and secret keys must all be kept secret from outsiders.Integrity on the other hand is typically a necessary security attribute to deliver trustworthy services to IoT users.

The integrity requirements for various IoT systems vary. Due to information sensitivities, a remote patient monitoring system, for example, will include strong integrity checking against random errors. Communication mistakes or data manipulation could result in the loss of human lives.

Because of the nature of IoT environments—where it is feasible for communication to occur between M2M devices, humans to humans, and/or humans—devices' IoT connectivity exacerbates the authentication issue. Different systems need different solutions due to various authentication requirements. Some solutions, like the authentication of bank cards or banking systems, must be solid. On the other hand, while some will need to be local, such as ePassport, most will need to be international. The authorization property restricts certain network actions to just authorized entities (any authenticated entity).

A device's user (or the device itself) must be able to access services whenever they are required. Many hardware and software components of IoT devices must be durable to continue to function even in the presence of malevolent actors or challenging circumstances. Various systems have different needs for availability. For instance, monitoring systems for fires or medical conditions would probably need more availability than sensors for roadside pollution.

Accountability adds redundancy and accountability to specific activities, obligations, and planning of the implementation of network security policies while building security solutions to be utilized in a secure network. Although accountability by itself cannot thwart assaults, it is useful in verifying that the other security measures are effective. Integrity and confidentiality are fundamental security concerns that may be ineffective without accountability. Additionally, in the event of a repudiation incident, an entity would be held accountable for its acts through a procedure that might help confirm the details of what occurred and determine who was actually to blame for the occurrence.

An entity has the right to privacy to decide how much it will interact with its environment and how much information about itself it is ready to share with others. IoT's primary privacy objectives are:

- Device privacy which is dependent on physical and commuting privacy. When a gadget is stolen or lost or is

vulnerable to side-channel assaults, sensitive information may leak out of it.

- Communication privacy is dependent on device availability, device integrity, and device dependability. IoT devices should only communicate when necessary to avoid disclosing private data while communicating.

- Storage privacy –Two main factors should be taken into consideration to safeguard the privacy of data stored on devices. The first factor is that devices should be able to retain whatever necessary data volumes and the second factor is that regulations must be expanded to secure user data after a device's life cycle (deletion of the device's data, or "Wipe") if the device is stolen, lost, or not in use.

- Processing privacy is device and communication integrity dependent. Without the data owner's knowledge, data should be released to or obtained from third parties.

- Identification privacy: Only a human or approved device should be able to determine the identity of any device.

- Location privacy: Only an authorized entity (person or device) should be able to determine the relevant device's location.

Conclusion

The idea of combining computers, sensors, and networks to monitor and control items has been around for a while, but the recent convergence of important technology and commercial trends is giving rise to a new reality for the Internet of Things.Concerns about security and privacy are the biggest barrier to IoT advancement. The operation of IoT is characterized by security at all levels.People's perceptions of what being online entails may change if the Internet of Things develops into a pervasive network of connected gadgets. Despite the tremendous implications, this vision may face several barriers and challenges, particularly in the areas of security, privacy, standards, and interoperability, legal and regulatory issues, as well as the inclusion of emerging economies. Concerning a wide range of stakeholders, the Internet of Things is about a complex and dynamic collection of technological, social, and political considerations. Currently, the

Internet of Things is being used, and there is a need to address its security issues, optimize its advantages, and lower its risks.

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ROC CURVE AS A KEY STATISTICAL TOOL IN SPECIFIC RESEARCH AREAS

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Abstract
Integrating statistics in different areas of research sometimes is a difficult task to handle for a non statistical expert. An interesting use of statistical knowledge and statistical software is a ROC curve. ROC curves have become a challenge these recent years because they are an interesting usage of statistics in medicine, radiology, natural hazards and also machine learning.
A ROC (Receiver operating characteristics) curve is a plot that depicts the trade-off between the sensitivity and 1- specificity across a series of cut-off points when the diagnostic test is continuous or on ordinal scale [1]. The AUC (area under ROC curve) is widely used to calculate the performance of the classifiers and it performs well as a general measure to predict accuracy [10].
We will show how to use statistical software to construct a ROC curve, to calculate the AUC and to interpret the results in a study conducted in medicine. We will use data from cardiology to examine the impact of using ROC curve to determine the model fit in a logistic regression model.
Keywords: ROC, AUC, logistic regression, statistics, software

Introduction
Nowadays has become a difficult task to integrate statistics in different areas of research especially for a non statistical expert. ROC curves

are an interesting usage of statistics in medicine, radiology, natural hazards, machine learning etc.

A ROC (Receiver operating characteristics) curve is a plot that depicts the trade-off between the sensitivity and 1- specificity across a series of cut-off points when the diagnostic test is continuous or on ordinal scale [1]. The AUC (area under ROC curve) is widely used to calculate the performance of the classifiers and it performs well as a general measure to predict accuracy [10].

We will focus on using the ROC curve in the case of logistic regression model in a research conducted with medicine data. The dependent variable is Stent Thrombosis (coded 0 and 1), with value 1 that indicates the patients with stent. There are 15 explanatory variables in the model, but all of them are not significant in the model.

Stent thrombosis is a thrombotic occlusion of a coronary stent. It is considered a major complication associated with stent placement in percutaneos coronary intervention [18]. Considering 15 covariates, we constructed a logistic regression model in the case of studying the presence of stent thrombosis in the patients hospitalized. We used SPSS to obtain the logistic regression model and also to construct a ROC curve.

Since the initial contribution of Green and Swets (1966), ROC curves have been used in a wide variety of applications including anomaly detection in signal analysis, medical diagnosis, search engines, credit-risk screening etc. (Bertail et. al 2008) as a visual tool for evaluating the performance of a test statistic regarding its capacity of discrimination between two populations (Fawcet 2003).

A measure of goodness of fit that is often used to evaluate the fit of the logistic regression model obtained is based on the simultaneous measure of sensitivity (the True Positive) and specificity (the True Negative) for all possible cutoff points [11].

First, we calculate sensitivity and specificity pairs for each possible cutoff points and plot sensitivity on y axis by 1-specificity on the x axis. Each point on the ROC curve represents a sensitivity/specificity pair corresponding to a particular decision threshold. So we obtain the ROC curve (See [19]).

The AUC (Area under the Curve) it is a good indicator for the model fit and it ranges from 0.5 and 1 with larger values that indicate a better fit. In general, an AUC of 0.5 suggests no discrimination, a value from

0.7 to 0.8 is considered acceptable, from 0.8 to 0.9 is considered excellent and more than 0.9 is considered outstanding [9].

The AUC is a measure of the usefulness of a diagnostic test in general where a greater area means a more useful test (Melo 2013).

The area under a receiver operating characteristic (ROC) curve, abbreviated as AUC, is a single scalar value that measures the overall performance of a binary classifier (Hanley and McNeil 1982). The AUC value is within the range [0.5, 1.0], where the minimum value represents the performance of a random classifier and the maximum value would correspond to a perfect classifier (e.g., with a classification error rate equivalent to zero).

The AUC is a robust overall measure to evaluate the performance of score classifiers because its calculation relies on the complete ROC curve and thus involves all possible classification thresholds. The AUC is typically calculated by adding successive trapezoid areas below the ROC curve [12].

There are some difficulties that associate our study. First, it is not easy to find an appropriate logistic regression model to determine the significant factors and to obtain important conclusions in the area of study. Second, we must apply and interpret correctly the results obtained from ROC curves.

Nevertheless, in our study we can see that the logistic regression model obtained is associated also with a very good value of AUC.

Objectives

The aim of this paper is to demonstrate the use of ROC curves in logistic regression in a study with data from cardiology. From the medical point of view, we want to obtain the significant factors in the model and to identify the risk factors for stent thrombosis of the patients. From the statistical point of view we want to obtain a logistic regression model and to examine the impact of using ROC curve to determine the model fit.

Methodology

      1.   Data in the case study

Study population is the group of the patients undergoing coronary intervention proceduresat the Heart Catheterization Center in

University Medical Center of Tirana "Mother Teresa" Albania.We used the data records from the Cardiology Department with a total of 2201 patients that include the following variables: Gender, Age, Coronary Artery Disease, Diabetes Mellitus, Ejection Fraction (less than 40), Body Mass Index (greater than 30), Smoking, Dyslipidemia, Post Myocardial Infarction, Dissection, Lesion type, Diameter of Stents, Length of Lesion, Dual Antiplatelet Therapy and Arterial Hypertension. Many of them are considered as risk factors for heart failure and we are interested to examine the impact of using ROC Curves to determine the model fit for the impact of these risk factors in the case of stent thrombosis of the patients studied.

2. Roc Curves

A ROC curve is a graph showing the performance of a classification model at all classification thresholds. This curve plots two parameters: True Positive rate and False Positive rate.
True Positive rate is defined as follows:

$$TPR = \frac{TP}{TP + FN}$$

False Positive rate is defined as follows:

$$FPR = \frac{FP}{FP + TN}$$

A ROC curve plots TPR versus FPR at different classification thresholds. Lowering the classification threshold classifies more items as positive, thus increasing both False Positives and True Positives. To compute the points in an ROC curve we could evaluate a logistic regression model many times with different classification thresholds, but this would be inefficient. Fortunately there is an efficient sorting based algorithm that can provide this information for us called AUC (Area under the ROC curve) [See 14]

AUC measures the entire two dimensional area underneath the entire ROC curve from (0,0) to (1,1) and provides an aggregate measure of performance across all possible thresholds. One way of interpreting AUC is as the probability that the model ranks a random positive example more highly than a random negative example. AUC ranges in value from 0 to 1. A model whose predictions are 100% wrong has an AUC of 0; one whose predictions are 100% correct has an AUC of 1 [14].

Based in [14] we can identify the reasons why AUC is desirable: First, AUC is scale-invariant. It measures how well predictions are ranked, rather than their absolute values. And second, AUC is classification-threshold invariant. It measures the quality of the model's predictions irrespective of what classification threshold is chosen.

But the usefulness of AUC is limited if we do not want the before mentioned situations.

3. Spss

SPSS (Statistical Package for the Social Sciences) is a statistical package and it is used by researchers to conduct advanced statistical analysis. In our study we used SPSS to obtain the results for Multiple Logistic Regression model and also the AUC.

Results

We used the data records from the Cardiology Department in a hospital in Tirana, Albania, with a total of 2201 patients that include: Gender, Age, Coronary Artery Disease, Diabetes Mellitus, Ejection Fraction, Body Mass Index, Smoking, Dyslipidemia, Post Myocardial Infarction, Dissection, Lesion type, Diameter of Stents, Length of Lesion, Dual Antiplatelet Therapy and Arterial Hypertension. Based in recent researches, many of them are considered as risk factors for stent thrombosis. Our main interest is to construct a model that determines the impact of these risk factors in stent thrombosis of the patients studied and especially to use ROC Curves in this study.

The dependent variable is Stent Thrombosis, which is a dichotomous variable with value 1 that indicates the patients with stent and the value 0 that indicates the patients without stent thrombosis. We performed Multiple Logistic Regression using SPSS to determine which factors are significant in the model, and the impact of each of them in the dependent variable following the hospitalization for the patients with heart failure.

There are 15 explanatory variables in the model, but not all of them are significant in the model. We have marked with red color the significant variables in the model in the table below.

Using SPSS, we obtained the following results [4]:

The Omnibus Tests of Model Coefficients give a p-value 0 for our model. Also Cox & Snell R Square value is 0.168 and Nagelkerke R

Square is 0.471. Hosmer and Lemeshow Test gives a p-value equals 0.079. The Classification table gives us an Overall Percentage 95.9.

Table 1 Coefficients estimations, odd ratios and 95% confidence intervals for the odd ratios

	Coefficient	S.E.	Sig.	Odd Ratios	95% C.I.for Odd Ratios	
					Lower	Upper
GENDER	-.403	.268	.133	.668	.395	1.131
AGE	-.028	.015	.070	.973	.944	1.002
SAK(1)	-2.724	.414	.000	.066	.029	.148
SAK(2)	-1.163	.270	.000	.313	.184	.531
EF(≤40)	-1.083	.246	.000	.339	.209	.548
DIABET	-.157	.254	.535	.854	.520	1.404
SMOKING	-1.113	.339	.001	.329	.169	.638
DISLIPID	2.653	.332	.000	14.196	7.398	27.238
BMI(>30)	-.165	.295	.577	.848	.475	1.513
PostIM	-1.852	.272	.000	.157	.092	.267
HTA	1.448	.307	.000	4.256	2.331	7.771
DISEK	.818	.567	.149	2.265	.746	6.880
DAPT	3.551	.404	.000	34.858	15.798	76.909
DIAMETER	-2.148	.413	.000	.117	.052	.262
LENGTH	.007	.013	.569	1.007	.983	1.032
LEZIONB2c	1.291	.314	.000	3.638	1.968	6.727
Constant	5.669	1.718	.001	289.749		

In our study we also used SPSS to perform ROC analysis. The command used is: *Analyze…..ROC curve*.
(Determining the Test variable and the State variable (the dichotomic variable with the corresponding value of the state variable which is 1 in our case)
The results are as follows:
Table 2Summary table from ROC Analysis

Case Processing Summary

stent	Valid N (listwise)
Positive[a]	127
Negative	2074

Larger values of the test result variable(s) indicate stronger evidence for a positive actual state.

a. The positive actual state is with stent.

Table 3 AUC results from ROC Analysis

Area Under the Curve

Test Result Variable(s): Predicted probability

Area	Std. Error[a]	Asymptotic Sig.[b]	Asymptotic 95% Confidence Interval	
			Lower Bound	Upper Bound
.911	.014	.000	.883	.938

a. Under the nonparametric assumption

b. Null hypothesis: true area = 0.5
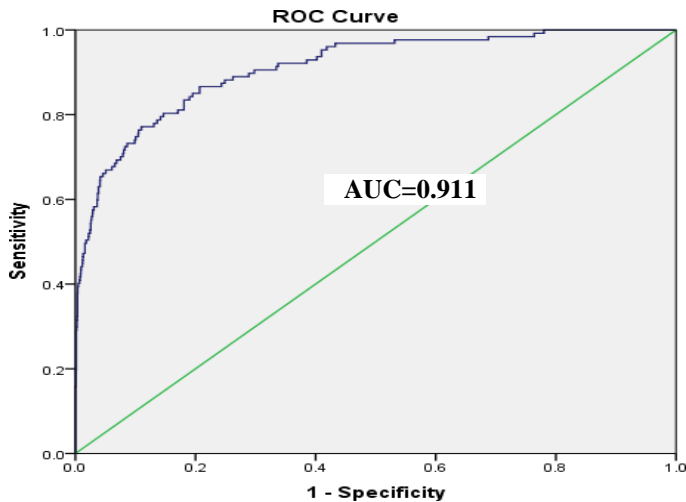
Figure 1 ROC Curve and AUC value for Logistic Regression model obtained

Based on the above results, we notice that we have these significant factors: Coronary ArteryDisease, Ejection Fraction, Smoking,

Dyslipidemia, Post Myocardiac Infarction, Lesion type, Diameter of Stents, Dual Antiplatelet Therapy and Arterial Hypertension (this is determined by the p- value in the corresponding column in each table, a p-value less than 0.05 indicates a significant factor in the model).

An interpretation of the results of the Logistic Regression Model are as follows:

Based on the odd ratios we can say that the patients with the third type of disease are more likely to have stent thrombosis than those with the first and the second type. In the case of Ejection Fraction (EF in the tables above) we can say that the patients with the value of Ejection Fraction less than 40 are more likely to have stent thrombosis than those with the value of Ejection Fraction more than 40. In the case of Smoking, based on its odds ratio, we can say that a patient that not smokes is more likely to not have stent thrombosis than a patient who smokes. For a patient with dyslipidemia, we have high value of odds ratio that indicates that a patient with dyslipidemia is not more likely to have stent thrombosis than a patient without dyslipidemia. In the case of Post Myocardial Infarction (Post IM) we can say that a patientthat is post myocardial infarction is more likely to have stent thrombosis than a patient that is not post myocardial infarction. For a patient with arterial hypertension (HTA), based in the odds ratio we cansay that is not more likely than a patient without hypertension to have stent thrombosis. Based on the odds ratio we can say that a patient hospitalized that had not had Dual Antiplatelet therapy is more likely to have stent thrombosis than a patient with Dual Antiplatelet therapy.Based on the value of odds ratio, we can say that patients without this type of lesion are more likely to develop stent thrombosis compared with the patients with type of lesion B2/C. Another significant predictoris the variable Diameter of Stents that is not a categorical variable likeother predictors. The odd ratio value is 0.117. So for each additional increase of a one unit in the diameter of stents is associated with a decrease in the odds of having stent thrombosis [4].

Based on the results using ROC curves in the case of our model indicates a good model fit for the data. The Area under the Curve is 0.911 which is a very good value (it is considered outstanding) with 95% confidence interval]0.833; 0.938[.The AUC is significantly different from 0.5 since the p-value (Null hypothesis: True area equals

0.5) is p=0<0.05. This means that this logistic regression classifies better than by chance and we have a very good model fit.

Conclusions

Our main objective in this study is to use ROC Curves in Logistic Regression in a study with data from cardiology.

We used *Multiple Logistic Regression* with SPSS with 15 covariates to construct a model to predict the *Stent Thrombosis*. Based on the results we can conclude that the model obtained is a good model: The *Omnibus Tests of Model Coefficients* indicates a significant model, *Hosmer and Lemeshow Test* indicates that the model fits the data and the overall percentage must be at least 80% (in our model this value is95.9%).

Factors that are significant in the model are: Dyslipidemia, Arterial Hypertension, Dual Antiplatelet Therapy, Lesion type (B2c), Ejection Fraction (EF), Coronary Artery Disease, Smoking, Post Myocardial Infarction and Diameter of Stents.

Results from using ROC Curves indicate a good model fit for the data. The Area under the Curve is 0.911 which is a very good value (it is considered outstanding). The AUC is significantly different from 0.5 since the p-value is p=0<0.05. This means that this Logistic Regression model classifies better than by chance and we have a very good model fit.

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STATISTICAL TECHNIQUES USING R FOR IMPUTE MISSING DATA IN REGRESSION ANALYSIS

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Abstract
In this paper, we deal with missing data encountered in regression analysis. Missing data is a phenomenon, detected in many scientific investigations due to the bias often caused and inefficient analysis of the data. Determining the appropriate analytic approach in the presence of incomplete observations is a major question for data analysts. Recently many scientists have developed several statistical methods to address missingness.

We have reviewed an important issue in regression analysis (missing data), as well as some handling methods for this problem using R. Finally, we will realize a simple simulation study and real data to compare different handling methods of missing data. Also, we will compare the results obtained from both simulation and real data and packages for completing the missing values.

Keywords: Missing data, mice, multiple imputation, R- language.

Introduction

The missing data is a common and essential topic in statistics. There are many methods proposed to handle the missing data. Missing data is a common occurrence in many areas of research and their existence sometimes creates problems in the quality of conclusions. Data may be missing for a variety of reasons. When these data occupy a large part of the data, such that they represent a group that is relevant to the problem, because of their importance, compared to the others, we must definitely consider them.

Using statistical methods we can impute the missing values in such a way that the completed information is as close as possible to the real data. In this paper, we will describe and demonstrate some of the most commonly used statistical methods for imputing missing values.

We will treat missing data in regression analysis for real data. These data were taken from the hospital and are measurements on cholesterol in different patients over a three-year time interval

The regression analysis of real data is an important area of statistics. Because the data are records taken through time, the presence of missing observations in the different data are very common. Different data may require different strategies for estimating these missing values. We emphasize especially the necessity of using these strategies as effectively as possible to obtain the best possible estimates.

In this paper, we have reviewed an significant problem in regression analysis (missing data), as well as some handling methods for this problem using R. And we will realize a simple simulation study and real data to compare different handling methods of missing data. Also, we will compare the results obtained from both simulation and real data and packages for completing the missing values.

Missing value mechanisms

There are three general missingness mechanisms to distinguish for the responsible generating processes after missing values (see Rubin (1987) [8], Rubin and Little (2002), [9], [10]). Let $X = (x_{ij}), 1 \leq i \leq n, 1 \leq j \leq p$ denote the data, where n is the number of observations and p the number of observed variables (dimensions), and let $R = (R_{ij}), 1 \leq i \leq n, 1 \leq j \leq p$ be an indicator of whether an observation is missing $R_{ij} = 1$ or not $R_{ij} = 0$. The missing data

mechanism is characterized by the conditional distribution of R given X, denoted by $p(R/X,\varphi)$, where φ indicates unknown parameters.

Then the missing values are Missing At Random (MAR) if it holds for the probability of missingness that
$$p(R/X,\varphi) = p(R/X_{obs},\varphi) \quad (1)$$
Here $X = (X_{obs,}X_{miss})$ denotes the complete data, where X_{obs} and X_{miss}

are the observed and missing parts, respectively. Hence the distribution of missingness does not depend on the missing part X_{miss}.

If in addition, the distribution of missingness does not depend on the observed part X_{obs}, the important special case of MAR called Missing Completely At Random (MCAR) is obtained, given by
$$p(R/X,\varphi) = p(R,\varphi) \quad (2)$$
If equation (1) is violated and the patterns of missingness are in some way related to the outcome variables, i.e., the probability of missingness depends on X_{miss}, the missing values are said to be Missing Not At Random (MNAR). This relates to the equation
$$p(R/X,\varphi) = p(R/(X_{obs},X_{miss}),\varphi) \quad (3)$$

Linear regression
Regression analysis is a statistical technique for investigating and modelling the relationship between variables. The aim of linear regression is to find a mathematical equation for a continuous response variable Y as a function of one or more X variable(s). So that you can use this regression model to predict the Y when only the X is known. In a linearregression model, the variable of interest (the so-called "dependent" variable) is predicted from k other variables (the so-called "independent" variables) using a linear equation. If Y denotes thedependent variable, and $X_1, X_2,..., X_k$, are the independent variables, then the assumption is that thevalueof Y at time t (orrowt)inthedatasampleis determined bythelinearequation
$$Y_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + ... + \beta_k X_{kt} + \varepsilon_t$$
Where the $\beta_0, \beta_1,..., \beta_k$ are constants and the ε_t are

independent and identically distributed

(i.i.d.)normalrandomvariableswithmeanzero. β_0

called*intercept* of the model the expected value of Y when all the X 's are zero and β_i is the*coefficient* of the variable X_i.

We will use OLS method for estimate parameters. Ordinary least squares (**OLS**) is a type of <u>linear least squares</u> method for estimating the unknown <u>parameters</u> in a <u>linear</u> <u>regression</u> model.(see [1])

Detecting or diagnosing outliers is a very important process in regression analysis, so some methods concerning the detection of outliers will be illustrated, and are statistics that focus attention on observations having an influence on OLS estimator, see Barnett and Lewis (1994), [4]. Robust estimation provides an alternative to the OLS estimation when classical assumptions are unfulfilled, see Alma (2011), [3]. In this paper, we will study how missing values effect regression analysis.[5]

Regression analysis of real data with missing values

The dataset used in this article was taken in collaboration with the Korca regional hospital. All the data were collected for 200 patients over a three-year period from 2018-2020. Cholesterol data were obtained for these people ranging in age between 15 and 85 years old. In this study participated 122 males and 78 females. We have reviewed an important problem in regression analysis (missing data), as well as some handling methods for this problem using R.

We used the OLS method to estimate the unknown parameters for our data.

And we obtained the regression equation

$Y = 5.4 + 0.2 \cdot X_1 + 0.0001 \cdot X_2$,

Where denote Y -cholesterol, X_1 -age and X_2 -gender. Finally, we can

do the frequentist regression analysis in R to check that the all coefficients are well estimated by least squares, and with no missing data. (See figure 1)

Figure 1: Linear regression line which shows the relationship between cholesterol with age and gender

Note that the methods for handling missing data differ depending on the type of data, and therefore we cannot use any of them for any data. Our data does not have any missing values, but in order to compare the proposed methods, we will create 30% of missing data using the MAR mechanism. (See figure 2)
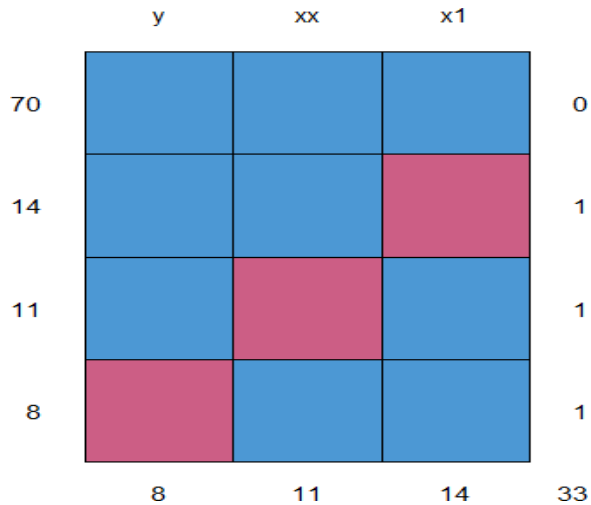
Figure 2: Missing data patterns. Blue is observed and red is missing data

Then we impute the missing values with "mean", "median", "Hmisc", "KNN" and "Mice" packages in R. (For more about these packages see [6], [7], [11])

Different imputation methods will have differing precision in reproducing missing values, where precision will depend on how much data are missing and how the data are missing. The characteristics of the dataset will also influence imputation precision between methods. After impute the missing data with proposed methods we will compare statistics MAE, MSE, RMSE and MAPE obtained after imputing the data. The Mean Squared Error (MSE), Mean absolute error (MAE), Root Mean Squared Error (RMSE), andmean absolute percentage error (MAPE) are used to evaluate the performance of the model in regression analysis.All of the above measures deal directly with the residuals produced by our model. For each of them, we use the magnitude of the metric to decide if the model is performing well. Small error metric values point to good predictive ability, while large values suggest otherwise. For more see Table 1 below:

Table 1: Statistical results after impute the missing values

	Im_mean	Im_median	Im_KNN	Im_PMM	Im_CRT	Im_RF	Im_Bayes
MAE	0.21738387	0.20990447	0.040611086	0.24873942	0.18659126	0.28562583	0.2757074
MSE	1.02948123	1.05084991	0.045946468	1.39572059	1.13314141	1.92036719	1.5274122
RMSE	1.01463355	1.02510971	0.214351273	1.18140619	1.06449115	1.38577314	1.2358852
MAPE	0.01726944	0.01721997	0.003449517	0.01981572	0.01233701	0.02188597	0.0197865

The lower value of MAE, MSE, MAPE and RMSE implies higher accuracy of a regression model.

We can notice a better performance of the KNN method used in calculating the statistics in the case of cholesterol data (see figure below).
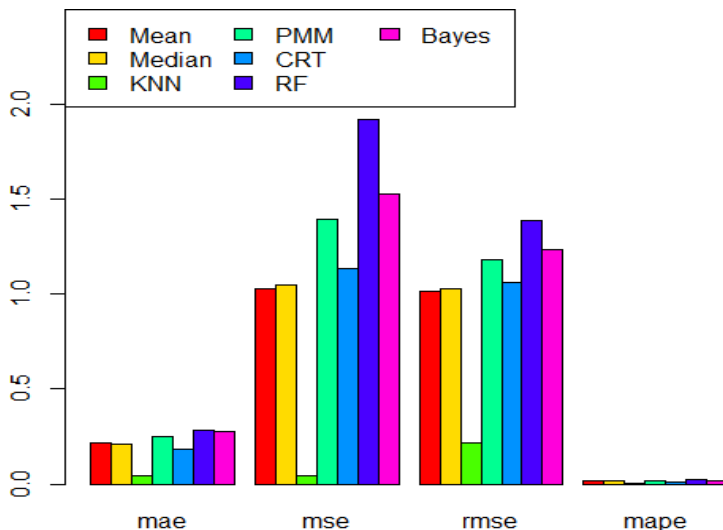
Figure 3: Statistical results after impute the missing values with proposed methods

For a further analysis to find the best proposed method in relation to linear regression we will also compare the AIC and BIC criteria. BIC was developed by a mathematician named Gideon E. Schwarz. A statistician, Hirotugu Akaike later developed his own version of the formula AIC (see [2], [12]).

AIC and BIC are widely used in model selection criteria. AIC means Akaike's Information Criteria and BIC means Bayesian Information Criteria. Though these two terms address model selection, they are not the same. One can come across may difference between the two approaches of model selection. The AIC can be termed as a mesaure of the goodness of fit of an estimated statistical model.

The Bayesian Information Criteria (BIC) is a type of model selection among a class of parametric models with different numbers of parameters. Models with lower BIC are generally preferred We will use these criteria to see which of the proposed methods for impute the missing data is the most appropriate. Then we will use the

R programming language for our data and the results obtained for the AIC and BIC criteria are given in the figure below.

Efficiency of MI methods
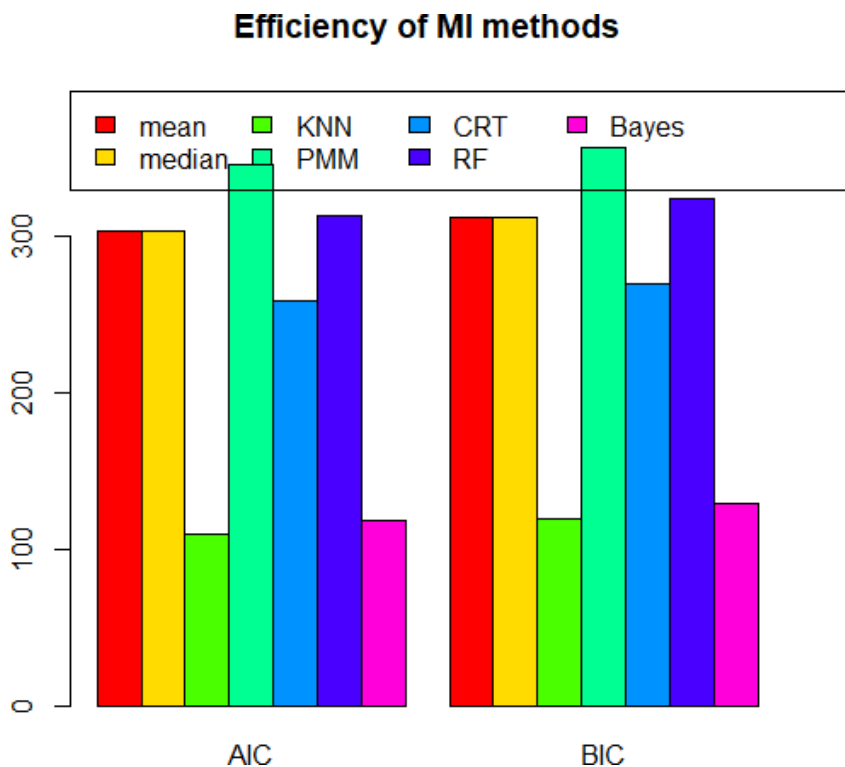
Figure 4: Graph of results for AIC and BIC criteria

We noticed the model with the lowest AIC and BIC score is preferred. From Figure 4 we can see a better performance of the KNN method compared with other methods for impute the missing data.

Simulation study

We will use a simulated data set so that we know the correct inferences, and so can see the effect of missing data. We will now simulate data on 200 subjects, aged between 20 and 80 years old, and evenly divided between males and females. We can simulate such a data set in R. We will follow the same idea as in the case of real data for the construction of the regression equation.

And we obtained the regression equation, $Chol = 5 + 0.2 \cdot X_1 + 0.5 \cdot X_2$, Where denote *Chol* -cholesterol, X_1 -age and X_2 -gender. Assume sex

is coded as 1 = male, and 0 = female and suppose that the residual standard deviation is $\sigma = 1$.
We can examine the scatter plots in both males and females, see figure below:

Chol versus age in males

Chol versus age in females
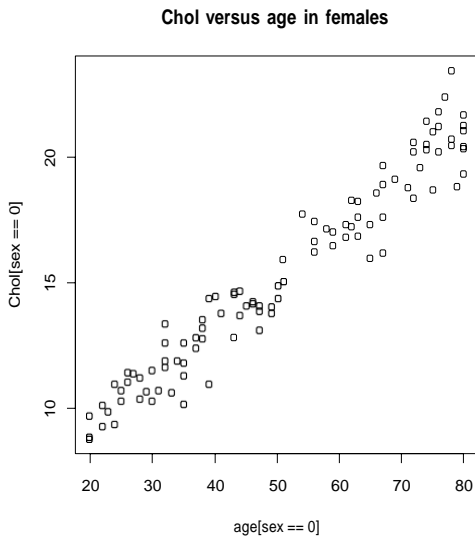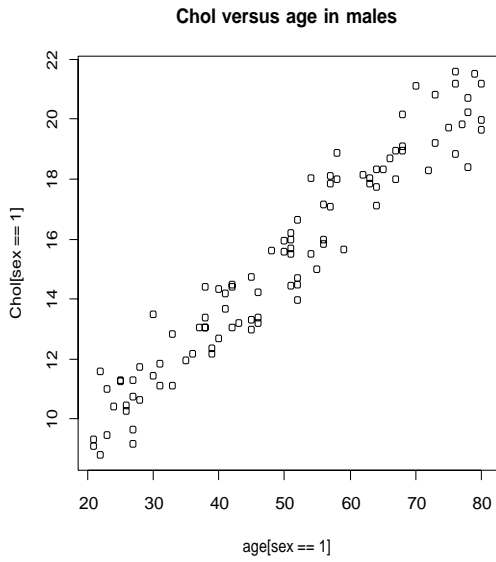
Figure 5: The scatter plots of regression which shows the relationship between cholesterol and gender, left males and right females

Finally, we can do the frequentist regression analysis in R to check that the two coefficients are well estimated by least squares, and with no missing data.

What happens in this case if we have missing data?

Suppose that, in particular, 30% of the age and 30% of the sex data are in fact missing.

First, suppose they are missing at random (MAR). MAR missing data, the probability that an item is missing can be related to values, but only observed values, not unobserved values. The idea is that under MAR data, one can use observed values to "recapture" the essence of the missing data, and so still derive valid inferences. We can use the same idea even if the values are lost under the MCAR mechanism.

Now we impute the missing values with proposed methods and see the performance of each method in the regression analysis.

These results can be seen more clearly in the following figure:
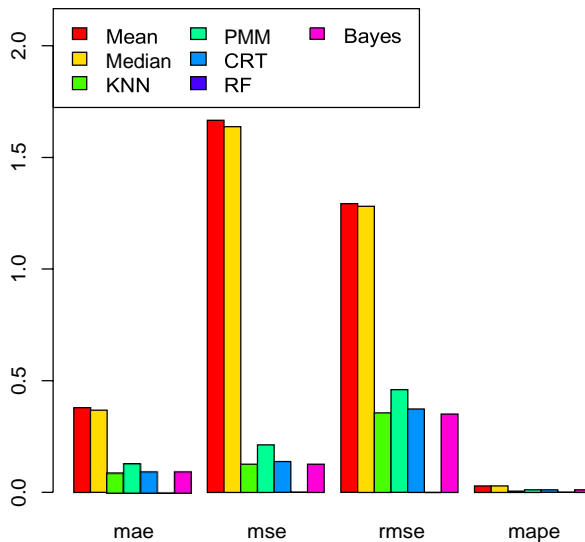
Figure 6: Statistical results after impute the missing values with proposed methods in simulated data

We note that the proposed methods maintain the same performance in the case of simulations data. Even in this case, the KNN method has better performance in regression analysis compared to other methods.

Conclusions

In this paper, we studied some statistical methods for impute missing data in regression analysis. We compared the performance of some methods for impute missing values in regression analysis. We will look at two different data sets, one simulated in R, the other a real data set from the Korca regional hospital. In both data, that has no missing data we used the MAR mechanism to create 30% of missing data. Then we imputed the data using multiple imputations functions from different packages in R. And after that we impute the missing values with "mean", "median", "Hmisc", "KNN" and "Mice" packages. We note that different handling methods of missing data must be examined to determine a good estimation of missing values because there is no one suitable method for all datasets.

According to our study, we find the KNN method is better than the other methods to estimate the missing values in regression models with real data and simulated data. In both cases, the proposed methods keep the same trend. And last we built and adapted the scripts for the packages used in R language.

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TECHNIQUES OF SOLVING MATHEMATICIAL PROBLEMS

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Abstract

Solving mathematical problems is an action which, in addition to mathematical scientific knowledge, also requires knowledge about the techniques of solving these problems, which is as important as scientific and academic knowledge, as a clear and understandable solution of the exercise saves half the time and effort of solving it.

In this paper are presented some techniques of solving mathematical problems which serve the reader, teacher or student to solve the exercises and to make this solution as easy and accessible as possible for others.

This paper is organized in such a way, where in the first part we have presented the principle of working backwardsand its applications in concrete mathematical exercises from number theory, geometry, arithmetic, etc.

The second part presents the principle of invariance and its applications in concrete examples and the third part shows the extremal principle.

The fourth and fifth part presents Dirichletprinciple and mathematic induction principle respectively.

In some of the chapters, in addition to examples and solved exercises, we have a list of challenging unsolved exercises and independent work for the reader.

This material is addressed to dedicated math students. It is known that the systematic solution of problems is the best way to learn and master mathematics.

The problems we have chosen are the ones that arouse curiosity, as they are not automatic applications of memorized procedures, but genuine mental challenges.

The goal is ambitious: We want to present as concisely as possible ideas, strategies, principles, techniques, habits for solving exercises and mathematical problems.

Keywords:*mathematical problems,problem solving, principle of invariance, extremal principle, mathematic induction principle,Dirichletprinciple, principle of working backwards.*

Principle OfWorking Backwards

The bottom-up model is one of the oldest problem-solving techniques, used since antiquity. The ancient Greeks used this method in construction problems. They assumed that an object was built complete and then walked back step by step up to the data they had. This principle applies when we do not have a large number of steps to step back. How is the situation one step ahead? What about two steps ahead, how is the situation? There should be a little opportunity after each step back.

To concretize this principle we are illustrating it with some typical problems. Carl Gustav Jacob[1]in the last century emphasized: *You must always walk from the end*. His statement turned out to be very fruitful for him. At that time the most popular issue was Elliptic Integrals. Using his principle, he transformed elliptic integrals and made his greatest discovery, elliptic functions, which were much easier to handle than their inverse, elliptic integrals. Interpretation and application of this principle help in the progress of problem situations that seem unsolvable. In fact, this method is used when we have assumed that there is a solution to the problem, not in cases where we are convinced that there is no solution or when there is a contradiction. Let us solve some exercises with the assumption from the opposite.

Exercise 1: Around a circle are randomly placed 4 units and 5 zeros. Then between any two identical values we write 1 and between two different values, we put 0. Finally, we subtract the initial values we had. This process is repeated several times. Show that 9 zeros will never be taken even after a considerable number of steps.

Solution: It seems like a problem that can also be solved by means of invariance. We start with some distribution around the circle and use

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[1]*German mathematician, (December 1804 – February 1851)*

the above transformations, we get the string:
$011101000 \rightarrow 011000111 \rightarrow 010110110 \rightarrow 000100101....$
With a superficial look we can not distinguish the invariant, so we think to use the working method from the end. Assume that the goal is achievable. Initially we have 9 units. One step ahead we had 9 zeros and one step ahead we had $0 -1- 0 -1-...$ with an odd number (9), which is not accessible.

Exercise 2: From a point that is not on a line,construct a plane perpendicular to the line (d).

Solution: We are dealing with a construction problem, which is solved with the working technique from the end.

Analysis. If there exists a plane α containing the point P and is perpendicular to the line (d), then the line (d) will be perpendicular to the two lines of the plane α, intersected at a point O of the line (d). So the plane α is defined by two lines (b) and (c). The line (b) is in the plane β contains the point P, is perpendicular to the line (d) and intersects it at the point O. The line (c) lies on a plane γ, contains the point O and is perpendicular to the line (d).

Construction. Take two different plans β and γ containing straight line (d), but plan β to contain the point P. From the point P, in the plane β we construct the line (b) perpendicular to the line (d) that intersects it at the point O. From the point O on the plane γ we construct the line (c) perpendicular to the line (d). The lines (b) and (c) are different but have one point O in common, so they intersect at this point. Consequently, they set a plan $\alpha = ((b),(c))$. The plan α is the plan required.

Certification. From the construction, the plan α contains the point P as it contains the straight line (b). From the construction also the straight

lines (b), (c) are cutting into O. Since the straight line (d) is perpendicular to both straight-cutting (b), (c) planα, then straight lines (d) would be perpendicular to the plane α.
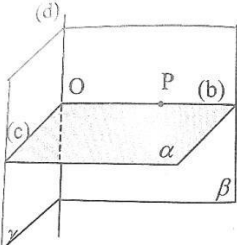

Figure 1

Discussion. The plane containing the point P and is perpendicular to the line (d) is unique. If we were to assume that there is another plane α_1 that contains the point P and is perpendicular to the line (d), then these planes would be parallel. But since they would have one thing P in common, they would intersect.

It remains that the plane which contains the point P and is perpendicular to the line (d) is unique.

Exercise 3: Through a point B that is not in the given plane α, construct a line (d) that is parallel to the given plane and perpendicular to a given line (a).

Solution: Plan α, line (a) and a point are given $B \notin \alpha$.

Analysis. If there exists a line (b) that contains the point B, is parallel to the given plane α and perpendicular to a given line (a), then thisline (b) will be in a plane β which will contain the point B and will be perpendicular to the line (a) as well in a plan γ which will contain the point B and will be parallel to the plan α. So the line (b) will be the intersection of the planes β and γ.

Construction. Through the point B we construct the plane γ parallel to the plan α.

Through the point B we construct the plane β perpendicular to the line (a).

The different planes β and γ have in common the point B, so they are cut according to a straight line. This is the required line (b).

Certification. The different planes β and γ have in common the point B, so they are cut according to a line containing the point B. So the line (b) contains the point B.

The line (b) is in the plane γ that is parallel to the plane α. So the line (b) is parallel to the plane α. The line (b) is located in the plane β that is perpendicular to the line (a). So the line (b) is perpendicular to the line (a). So the line (b) is parallel to the plane α and perpendicular to the line (a).
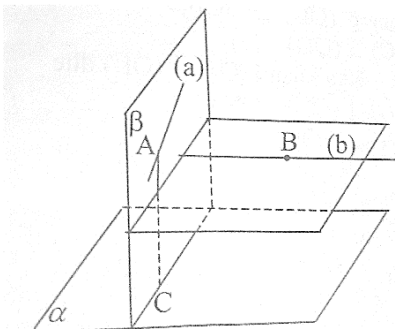
Figure 2

Discussion. If the line (a) were perpendicular to the plane α, then the planes γ and β would intersect. In this case the problem would have an infinity of solutions.

Principle Of Invariance

In general, an invariant is a state that remains constant during the execution of a given algorithm. In other words, none of the passes changes the value of the invariant. The principle of invariance is extremely useful in analyzing the final result or possible final results of

an algorithm because in this way we can exclude any other result that has different values with the invariant at any given step s_i.

Definition: We consider the set of states $S = (s_1, s_2, ..., s_n)$ and a set of crossings $T \subseteq S \times S$ defined as follows: $(s_i, s_j) \in T$ if and only if we can get out of the state s_i in the state s_j. An invariant about T is a function $f: S \to \mathbb{R}$ i tillë që $(s_i, s_j) \in T \implies f(s_i) = f(s_j)$.

In general for a given state s_1 and a rule for transitions, invariant lets us determine which steps we can follow from s_1.

This principle is applicable to the solution algorithms of mathematical games and transformations. Some questions that naturally arise when we apply the principle of invariance are: "What remains unchanged? Which is invariant? " or "If we have repetitions of steps, what remains unchanged?"

Since the Principle of Invariance is a very helpful and guiding principle, the only way to distinguish it in different exercises is to practice and identify it step by step in solving mathematical problems. Let us distinguish Invariant in the following examples of exercises.

Exercise 1: We start with the set of numbers $\{3, 4, 12\}$. At each step you can choose two of the numbers a, b and replace them with $0.6a - 0.8b$ and $0.8a + 0.6b$. Can you reach the goal (a) or (b) after a finite number of steps, where

(a) $\{4, 6, 12\}$ and (b) $\{x, y, z\}$ with $|x - 4|, |y - 6|, |z - 12|$ each less

than $\dfrac{1}{\sqrt{3}}$.

Solution:

(a) $(0.6a - 0.8b)^2 + (0.8a + 0.6b)^2 = a^2 + b^2$.   Since $a^2 + b^2 + c^2 = 3^2 + 4^2 + 12^2 = 13^2$, the point (a, b, c) is located on

the sphere with center on origin and radius 13. Since $4^2 + 6^2 + 12^2 = 14^2$ the solution lies on the sphere with center on origin and radius 14. The solution cannot be reached.

(b) $(x - 4)^2 + (y - 6)^2 + (z - 12)^2 < 1$. The solution cannot be reached.

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Exercise 2: Around a circle, 5 ones and 4 zeros are placed randomly. Then between each of the same two values we write zero and between

two different values we put 1. Finally, we subtract the initial values we had. If this process is repeated indefinitely, 9 zeros will never be obtained. Generalize!

Solution: The collection takes place $\bmod 2$: $0+0=1+1\equiv 0\bmod 2$, $0+1=1+0\equiv 1\bmod 2$. Let be $\left(x_1, x_2,..., x_n\right)$ the original distribution of zeros and ones around the circle. One step consists of a shift $\left(x_1, x_2,..., x_n\right)\leftarrow\left(x_1+x_2, x_2+x_3,..., x_n+x_1\right)$. We have two separate distributions $E=\left(1,1,...,1\right)$ and $I=\left(0,0,...,0\right)$. Here, we have to work

from the back. Suppose we reach $I=\left(0,0,...,0\right)$. Then the previous

step was $E=\left(1,1,...,1\right)$ and in front of that $n-she$ alternated

$\left(1,0,1,0,...\right)$. Since n is odd, an $n-she$ alternated $\left(1,0,1,0,...\right)$ does not exist.

Now suppose $n=2^k q$, where q is odd. The following interaction
$$\left(x_1, x_2,..., x_n\right)\leftarrow\left(x_1+x_2, x_2+x_3,..., x_n+x_1\right)\leftarrow\left(x_1+x_3, x_2+x_4,..., x_n+x_2\right)$$
$$\leftarrow\left(x_1+x_2+x_3+x_4, x_2+x_3+x_4+x_5,...\right)\leftarrow\left(x_1+x_5, x_2+x_6,...\right)\leftarrow\cdots$$
indicates that, for $q=1$, the iteration ends as $I=\left(0,0,...,0\right)$. For $q>1$

eventually we arrive at $I=\left(0, 0,..., 0\right)$, if we take an q identically with blocks of length 2^k, that is to say we have periods 2^k.

Exercise 3: Starting with 35 integers, 23 of them can be chosen and 1 added to each. By repeating this step several times, we manage to get 35 equal numbers. Prove this fact.

Now we replace 35 and 23 with *m* and *n* respectively. What conditions must be met so *m* and *n* can be reconciled after a certain number of steps?

Solution: Suppose $pmp(m,n)=1$. Then, knowing that $nx=my+1$ has solutions with.

$x, y\in\left\{1,2,...,m-1\right\}$. We write this equation in the form $nx=m(y-1)+m+1$. We place m positive integers $x_1, x_2,..., x_m$

around a circle, provided that x_1 is the smallest number. Continue as

follows: Divide the numbers into blocks by n numbers and add each number of a block by 1. If you perform this action n times, u will come around the circle m times and the first number will become one more

than the others. In this way, $\left| x_{\max} - x_{\min} \right|$ it will be reduced by 1. This will be repeated whenever a minimum element is replaced until the difference between the maximum and minimum element is reduced to zero.

But if $pmp(x, y) = d > 1$, then such a reduction is not always possible. Let one of these m numbers be 2 and the others be 1. Suppose that, by doing the same actions k times will be achieved in the distribution of $(m+1+kn)$ units in m numbers. That means that $(m+1+kn) \equiv 0 \bmod m$, but d does not divide $m+kn+1$ since $d > 1$.

Therefore m does not divide $m+kn+1$. Contradiction!

Exercise 4: Three integers a, b, c are written on the board. One of these numbers has been deleted and replaced by the sum of the other two minus one. This action is repeated many times until the final result is 17, 1967, 1983. Could the initial numbers have been 2, 2, 2? What if 3, 3, 3 could have been?

Solution: Initially, if all the components are greater than 1, then the trio will stand greater than 1. Starting with the second trio, the largest component is always the sum of the other two components, subtracted from 1. If, after a few steps we take (a,b,c) with $a \le b \le c$, then $c = a+b-1$ and a subsequent step gives the trio $(a,b,b-a+1)$. So we can have the last state $(17,1967,1983)$ uniquely up to the last step

$$(17,1967,1983) \leftarrow (17,1967,1951) \leftarrow (17,1935,1951) \leftarrow ... \leftarrow (17,15,31) \leftarrow (17,15,3)$$
$$\leftarrow (13,15,3) \leftarrow ... \leftarrow (5,7,3) \leftarrow (5,3,3)$$

The previous trio must be $(1,3,3)$ which contains 1, which is impossible. Thus the trio $(5,3,3)$ is generated in the first step. We can start from $(3,3,3)$ to $(5,3,3)$ in the next step, but we can not start from $(2,2,2)$ as it is impossible.

Extreme Principle

In this section we will look at the extreme principle, which is very useful, but very difficult to distinguish. It has also been called the

variational principle, which we will see later why it gets this name. This principle often leads to very brief affirmations.

The Extreme Principle is a methodology, a useful problem-solving tactic, by which it seeks a solution to a problem among potential candidates who meet some extreme conditions within the parameters of the problem.

We will try to prove the existence of an object with certain properties. The extreme principle tells us to choose an object which maximizes or minimizes certain functions. The resulting object is thenshown to have the desired property indicating that a small change willfurther increase or decrease the given function. Moreover, the extreme principle is largely constructive, providing an algorithm for constructing the object.

Let us look at three well-known facts which we will use to solve exercises from geometry, graph theory, number theory and combinatorics.

a. Every non-empty finite set A of nonnegative integers or nonnegative real numbers has a minimum element called min A and a maximum element called max A, which must be unique.

b. Any non-empty subset of positive integers has a smaller element. This is called the principle of order, which is equivalent to the principle of mathematical induction.

c. An infinite set A of real numbers has no minimum or maximum element. If A is bounded from above, then it has a smaller upper bound called sup A. If A is bounded from below then it has a larger lower bound called inf A. If sup $A \in A$, then sup $A = \max A$ and if inf $A \in A$, then inf $A = \min A$. Let us solve some examples using the Extreme Principle:

Exercise 1: Give n straight lines in a plane $(n \geq 3)$, not two by two parallels. Along each intersection of the two straight lines passes at least one other straight line. Prove that all straight lines pass along a point.

Solution: Assume that not all straight lines pass along a point. Examine all possible intersection points and select the smallest distance between these points across the straight lines. Assume that thesmallest distance is from the point A to the line l. At least three straight lines pass through the point A. They cross the line l at the

points B, C, D. From A we remove the perpendicular AP to the line l. Two of the points B, C, D are on the same side with P. Assume that they are C and D. Assume also that $|CP| < |DP|$. Then the distance from C to AD is less than the distance from A to l, which contradicts the choice of A and l.

Exercise 2: Let O be the point of intersection of the diagonals of a convex quadrilateral $ABCD$. Prove that, if the perimeters of the triangles ABO, BCO, CDO and DAO are equal, then the quadrilateral $ABCD$ is a rhombus.
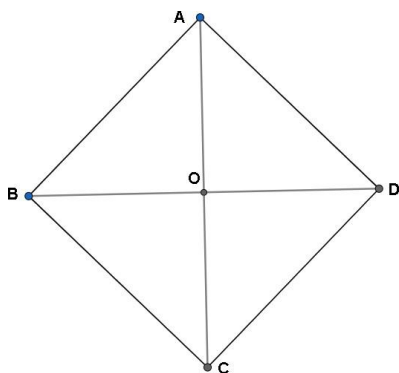
Figure 3

Solution: Let us assume that $|AO| \geq |BO|$ and $|DO| \geq |BO|$. Let B_1 and C_1 be the reflections of B and C about O. We denote the $P(XYZ)$ perimeter of the triangle XYZ. Since the triangle B_1OC_1

lies inside the triangle AOD, we have that $P(AOD) \geq P(B_1OC_1) = P(BOC)$. This inequality turns into an inequality if $B_1 = D$ and $C_1 = A$. It $ABCD$ is therefore a parallelogram. Since $\left| |AB| - |BC| \right| = P(ABO) - P(BCO) = 0$, it follows that it $ABCD$ is a rhombus.

Exercise 3: A cube cannot be divided into a number of pairs of similar cubes.

Solution: Assume that the cube is divided into a finite number of similar cubes. His faces are then divided into distinct squares. We choose the smallest square between them. Turn the cube in such a way

that the smallest square is down. It is easy to see that the smallest

square is not located at the base boundary. It is located at the bottom of a "well" surrounded by larger cubes. To understand this well, we still need smaller cubes, and so on, until we reach the topface, which is divided into even smaller squares. Contradiction!

Exercise 4: Each convex polygon with area 1 is located on a rectangle with area 2.

Solution: Let AB be the diagonal or the longest side of the polygon. Building perpendicular a, b to AB the pass A and B. Then the polygon is completely located in the convex area bounded by a and b. Let be the X vertex of the polygon. Then $AX \leq AB$ and $XB \leq AB$. We insert the polygon into the smallest quadrilateral $KLMN$ with KL and MN that have points in common with C and D the polygon. $|KLMN| = 2|ABC| + 2|ABD| = 2|ABCD|$. Since the

quadrilateral is completely inside the convex polygon with area 1, we have that $|KLMN| \leq 2$.

Dirichlet Principle

The simplest version of the Dirichlet principle of the box is: *"If $(n+1)$ pearls are placed in boxes, then at least one of the boxes has more than one pearl. "*

This simple combinatorial principle was first used directly by Dirichlet (1805 - 1859) in number theory. Despite its simplicity, it has a large number of quite unexpected applications. It can be used to prove difficult theorems. Frank. P. Ramsey made extensive generalizations about this principle. The topic of Ramsey Numbers belongs to the deeper problems of combinatorics. Despite great efforts, progress in this area is very slow.

Any problem of the existence of finite or infinite sets is always solved by the box principle. The principle is a pure statement of existence. It does not help to find a busy box multiple times. The main difficulty is identifying pearls and boxes.

Let's look at some simple problems.

1. Ben has 3 pigeons and 2 cages. All the pigeons are put in the cage. Is there a cage with at least 2 pigeons?
2. Among the three persons, two of them are of the same sex.
3. Among 13 people, two of them have the same month of birth.

4.   8 people are sitting around a table. Show that among them there are at least 2 who were born on the same day of the week.

5.   There are 370 students in a school. Show that among them there are at least 2 who were born on the same day.

6.   Cinema City has the following show times: 10^{00}, 14^{00}, 16^{00}, 18^{00}, 20^{00}. One day, 7 students went to the cinema. Show that at least two students have seen the show at the same time.

7.   How many people do you need to make sure two people have the same birthday?

8.   The number of strands of a man's hair on his head does not exceed 300`000. The capital of Scythia has 300`001 inhabitants. Can it be asserted with certainty that there are two persons with the same number of hairs on their heads?

9.   If $q \cdot s + 1$ pearls are inserted into the s box, then there is at least one box more than the q pearl.

10.   If none of the numbers $a, a + d, a + 2d,..., a + (n-1)d$ are

divisible by n, then d and n are not prime between them.

11.   A table has the shape of an equilateral triangle with sides 2.

   (a) If hit 5 times, then there will be two holes with distance
   .

   (b) If hit 17 times, what is the minimum distance of the two holes at most?

Let's solve some examples using the Box Principle:

Exercise 1: S is a set of n positive integers. None of the elements of S is divisible by n. Show that there exists a subset of S such that the sum of its elements is divisible by n.

Solution: Examine   the amounts $a_1, a_1 + a_2, a_1 + a_2 + a_3,..., a_1 + a_2 +...+ a_n$. If any of the sums is divisible by n, the exercise is over. In contrast, two of these sums $a_1 +...+ a_i$ and $a_1 +...+ a_j$ have the same remainder when divided by n. Assume that $j > i$. Then the difference $a_{i+1} +...+ a_j$ is divisible by n.

Exercise 2: From 10 different two-digit numbers two different non-empty subsets can always be chosen such that their elements have the same sum.

Solution: A set of S made up of 10 two-digit elements, each of which ≤ 99 has a $2^{10} = 1024$ subset. The sum of the numbers in any subset of S is $\leq 10 \cdot 99 = 990$. There are fewer possible amounts than subsets. So there are at least two different subset S_1 and S_2 that the same amount. If $S_1 \cap S_2 = \varnothing$, then we are done. If not, we remove all common elements and place two non-dominant subsets with the same amount of their elements.

Exercise 3: In a room with $(m-1)n+1$ persons, are common m persons strangers or is a person who is known by n persons. Show if the "rule" stays the same even if a person leaves the room.

Solution: It must be proven that they are m strangers in the room or $n+1$ known acquaintances.

The step must be repeated: A person is selected who has left the room and removes all his strangers. This is repeated n times. At each step most $m-1$ people are removed from the room. There will be at least 1 person left. The chosen persons and any of the persons who have fled are $n+1$ common acquaintances.

Exercise 4: From 52 positive integers we can choose two of them such that their sum or difference is divisible by 100. Is this rule valid even if we have 51 positive integers?

Solution: Consider 50 boxes. In box 0 we put the numbers ending in 00. In box 1 we put the numbers ending in 01 or 99, in box 2 we put the numbers ending in 02 or 98, and so on. Finally, in box 49 we put the numbers ending in 49 or 51 and in box 50 we put the numbers ending in 50. Two of the 52 numbers will be in the same box. Their difference (if they have the same end) or their sum (if they do not have the same end) will always end in 00, so it will be divisible by 100. Whereas in the case of 51 numbers, such a pair does not exist. For example, 1, 2,…, 49, 50, 100.

Principle Of Mathematical Induction

Mathematics was distinguished early on for great human endeavors to

prove its particular subjects. This is because in mathematics the result

must have been proved before we can say that it is true. This does not rule out the possibility of mistakes made.

In those cases when it is required to be certified statements of the type $\forall n \in \Box$, $S(n) = ...$ certifications constructed using the principle of mathematical induction to read as follows: "Let there be $S(n)$ a full statement on the numbers $n \in \Box$ and assume that $S(n_0)$ is true for any integer n_0. If for all integers k, with $k \geq n_0$, $S(n_k)$ gives that $S(n_{k+1})$

is true, then $S(n)$ is true for all integers n greater than n_0.

Why do we need mathematical induction? Aren't 2, 3, 4, 5,…, 100,…, 10000 cases enough to prove the accuracy of a statement? Could it be that a statement applies to the first five cases and does not apply to the other cases? What if we say that the assertion applies to the 100 cases examined, why not say that the assertion applies to each number?

Let us look at the mistake made by Fermat, a great seventeenth-century mathematician, who thought that only a few cases examined were sufficient to draw a conclusion. In 1653 Fermat formulated the statement: All the numbers of the form $2^{2^{n}}+1$ for $n = 0, 1, 2, 3, ...$

are prime numbers. Fermat justified his claim as follows:

$n = 0$, $2^{2^{0}}+1 = 2+1 = 3$ (prime number)

$n = 1$, $2^{2^{1}}+1 = 2^2+1 = 4+1 = 5$ (prime number)

$n = 2$, $2^{2^{2}}+1 = 2^4+1 = 16+1 = 17$ (prime number)

$n = 3$, $2^{2^{3}}+1 = 2^8+1 = 256+1 = 257$ (prime number)

$n = 4$, $2^{2^{4}}+1 = 2^{16}+1 = 65536+1 = 65537$ (prime number)

Although for the other numbers the $n = 5, 6, 7,...$ Farm managed neither to deny nor confirm the assertion. But apparently, he suffices with only

5 cases gave his erroneous conclusion that the shape numbers $2^{2^n}+1$ are simple. Gauss later showed that $2^{2^5}+1$ it is not simple, as the number is $2^{2^5}+1$ divisible by 641.

Therefore, even if we have 100 consecutive confirmations, we cannot assert the accuracy of a statement. This makes us realize that we need to verify it for all possible cases and not just for some, even millions of

cases. For this the method of mathematical induction is applied, which represents an important form of proof in mathematics.

Suppose we want to prove that $1+2+3+...+n = \dfrac{n(n+1)}{2}$ for any natural number n. This formula is easily verified for small numbers like $n = 1, 2, 3$ or 4, but it is impossible to prove this for all natural numbers one by one. A more complete method is required for the general validation of the formula.

Suppose we have proved the equation for n the first cases. Let's try to prove the formula for the case of $n+1$. The formula is true for $n = 1$ since $1 = \dfrac{1(1+1)}{2}$. If we have proved the formula for n cases, then

$$1+2+...+n+(n+1) = \frac{n(n+1)}{2} + n + 1$$
$$= \frac{n^2 + 3n + 2}{2}$$
$$= \frac{(n+1)[(n+1)+1]}{2}$$

This is exactly the formula for the case of $(n+1)$.

This method of validation is known as mathematical induction. Instead of trying to prove a statement for any S integer subset from $\mathbb{N}$, an impossible task if S is an infinite set, we give a specific proof for the smallest integer we are sure of, then from a general argument, indicating that if the assertion stands in the case under consideration, then it will be true for the following case.

The second principle of mathematical induction.

Let be $S(n)$ a statement on integers, where $n \in \mathbb{N}$ and assume that $S(n_0)$ is true of any integer n_0. If the truth $S(n_0), S(n_0+1),...,S(k)$ brings that $S(k+1)$ is true for $k \geq n_0$, then the assertion $S(n)$ is true for all integers n greater than n_0.

The principle of mathematical induction tells us that 1 is the smallest natural number, it also tells us that natural numbers are fine-tuned.

The famous problem of all time is finding numbers x, y, z **and** n **natural such that** $x^n + y^n = z^n$

The limitation $n > 2$ is for the reason that if $n = 1$, then $2^1 + 3^1 = 5^1$ and

if $n = 2$ then $3^2 + 4^2 = 5^2$, which clearly seems to be true. The answer $n > 2$ is known as the "Fermat's Last Theorem". He has shown that if $n = 3$, we can not find three x, y, z such values that $x^3 + y^3 = z^3$

. He was the first to study and calculate all the cases for $n < 125080$, but all these saw the light of publication after his death. Mathematicians consider his work a way of mathematical validation.

Exercise 1: *Prove the equation* $1^2 + 2^2 + 3^2 + ... + n^2 = \dfrac{n(n+1)(2n+1)}{6}$, $\forall n \in$. $\Box$

Solution: *Step 1:* $n = 1$, then $1^2 = \dfrac{1(1+1)(2 \cdot 1 + 1)}{6} = \dfrac{1 \cdot 2 \cdot 3}{6} = \dfrac{6}{6} = 1$.

We see that is true for $n = 1$.

Step 2: Assume it is true $n = k$, $1^2 + 2^2 + 3^2 + ... + k^2 = \dfrac{k(k+1)(2k+1)}{6}$

.

Step 3: After adding both sides of it $(k+1)^2$, we get:

$$1^2 + 2^2 + 3^2 + ... + k^2 + (k+1)^2 = \dfrac{k(k+1)(2k+1)}{6} + (k+1)^2$$

Convert the right-hand side of this equation to this:

$$\dfrac{k(k+1)(2k+1)}{6} + (k+1)^2 = \dfrac{k+1}{6}(2k^2 + 7k + 6) = \dfrac{(k+1)(k+2)(2k+3)}{6}$$

Consequently:

$$1^2 + 2^2 + 3^2 + ... + k^2 + (k+1)^2 = \dfrac{(k+1)((k+1)+1)(2(k+1)+1)}{6} + (k+1)^2$$

Which shows that the expression for $(k+1)$ is a true statement. This reasoning is true for all k natural, therefore, based on true induction this assertion is true.

Exercise 2: *Prove that in a set of n straight lines in the plane, such that: any two straight lines whatever are not parallel and from each*

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point of the plane do not cross more than two straight lines, have $\dfrac{n^2 - n}{2}$ *intersections between them.*

Solution: *Step 1:* A single line has 0 intersections in the plan because there is no one to intersectwith, so the formula for $n = 1$equals to $\dfrac{1^2 - 1}{2} = 0$.

Step 2: Assume that this formula is true for $n = k$, so k straight lines in the plane that meet the condition have $\dfrac{k^2 - k}{2}$ intersections.

Step 3: Prove the assertion $n = k + 1$that $k + 1$lines in the plane that meet the given condition have $\dfrac{(k+1)^2 - (k+1)}{2}$ intersections.

We have k lines that have $\dfrac{k^2 - k}{2}$ intersections and we also add a line, which by the condition, is not parallel to any of k the previously given lines and which again will not pass at any intersection, so it will intersect all k previous lines at k different points , so $\dfrac{k^2 - k}{2}$ the first points will be added k other intersection points, so we have:, $\dfrac{k^2 - k}{2} + k = \dfrac{k^2 - k}{2} + \dfrac{2k}{2} = \dfrac{(k+1)^2 - (k+1)}{2}$ which is easy to prove. From the principle of complete mathematical induction, this equation is a real $\forall n \in \mathbb{N}$ number of lines.

Exercise 3: *Prove by mathematical induction the theorem* ***"The sum of*** n ***interior angles of a polygon with*** n ***sides is*** $S_n = \pi(n-2)$***,*** $n \geq 3$ ***"***

Solution: *Step 1:* For $n = 3$we have $S_3 = \pi(3-2) = \pi$, which is true.

Step 2: Assume the true assertion about the $(k-1)$ sides, so $S_{k-1} = \pi[(k-1) - 2] = \pi(k-3)$.

Step 3: Prove it for the k sides, removing a diagonal joining two

vertices as in the figure below, where the k sides is divided into a

sides. Then the sum of the interior angles of triangle and a $(k-1)$

the k sides is equal to the sum

$$S_k = S_3 + S_{k-1} = \pi + \pi(n-3) = \pi + \pi n - 3\pi = \pi n - 2\pi = \pi(n-2).$$
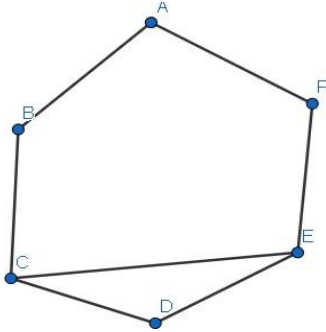

Figure 4

Exercise 4: *Prove that any natural number that appears in the form* $2^{2n} - 1$ *is divisible by 3.*

Solution: *Step 1:* For $n = 1$ we have $2^{2\cdot 1} - 1 = 4 - 1 = 3$, so 3 is divisible by 3.

Step 2: Assume that this is true for $n = k$, so it is $2^{2k} - 1$ divisible by 3. *Step 3:* For $n = k + 1$ we

have $2^{2(k+1)} - 1 = 2^{2k+2} - 1 = 4 \cdot 2^{2k} - 1 = 4 \cdot 2^{2k} - 4 + 3 = \left(2^{2k} - 1\right) + 3$,

which is seen is divisible by 3 because from step 2 we have that $2^{2k} - 1$ is divisible by 3, therefore its quadruple is divisible by 3.

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FREQUENCY EVOLUTION AND MANAGEMENT OF THE UPPER DIGESTIVE TRACT DISEASE

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Abstract
The upper gastrointestinal tract is traditionally considered as an empty muscular tube that gains the study importance in the second stage of digestion. However, this simple point of view is ignored by the fact that a part of this tract is one of the most important organs of the human body, the most sophisticated endocrine organ with unique physiology, biochemistry, immunology and microbiology. All swallowed materials, including our food, first of all come in contact with this part and especially this organ, and thus, the upper digestive tract is undoubtedly the most important segment within the GI tract. The normal physiology and morphology of this part can be interrupted by Helicobacter pylori infection, the most common chronic bacterial infection and etiological agent for most pathologies of this segment, especially peptic ulcers and stomach cancer.
In this study, are analyzed the frequency, diagnostic methods, treatments, complications, and evolution of the most common upper digestive tract pathologies, as well as new and most important aspects related to recommendations of healthy and sick people.
Conclusions can serve as a starting point for future studies on diseases of gastrointestinal tract based on the concept that a healthy stomach is the gateway to a healthy and balanced organism.
This philosophy should reinforce any public health efforts to eradicate major digestive tract diseases, including stomach cancer, one of the most deadly pathologies.

Familiarity with the problems that present the cases that were used for our study and the most common pathologies of the upper GI tract that we encountered, offered us some conclusions and recommendations.

Establishing a diagnosis of diseases of the upper digestive system requires reliable methods.

The use of endoscopy gives us valuable results. The earlier the patient reports signs and symptoms, the sooner the physician determines the diagnosis through efficient methods of examination and treatment, the more we can say that pathologies of the esophagus, stomach and duodenum are non-fatal and completely treatable.

Work Study
The work study at the Korca Regional Hospital highlighted:
- *diseases* that mostly affect this part
- *age group* according to pathologies
- *complications*
- *localization*
- *average day hospital stay*
- *state at the exit*
- *the way of treatment*
- *the main etiological factor*
- *the most valuable examination* as well
- *the importance of laboratory tests* for the detection of H. pylori.

Methodology
This is an *epidemiological*, transversal, analytical, observational study where disease is the first point of the study.

It was an efficient, low-cost study. Also, for the situation we are in, regarding Covid-19 we did not have to be in contact with many patients, medical staff or health institutions.

However, through this study we can not draw absolute results.

The population selection was based on the *medical records* of the Korca Regional Hospital.

In the Office of Statistics and the Cabinet of Endoscopy were obtained data from patients with diseases of the upper digestive tract, hospitalized in the ward Pathology and Surgery, for a period of *5 years* (2016-2020).

Basic Scientific Research methods were used. For the independent and demographic variables, a *descriptive analysis* was performed and for the dependent variables the processing of statistical data was performed according to the *SPSS program version 2020*.

Content analysis was performed using a wide range of domestic and foreign literature on diseases of the upper digestive tract.

Variables

Since we wanted to investigate the association between a *risk factor* such as H. pylori and *diseases of the upper digestive tract*, these two variables were included in the study as dependent variables.

In addition to these baseline variables, many other independent, universal variables (gender, age group, residence) were analyzed to interpret the influence of exposure on the risk of developing the disease, whether one variable confuses, modifies or is an intermediate factor.

For the scale of measurement of variables, *the nominal categorical scale* was used, where the categories do not follow any certain rule and *the nominal dichotomous scale*, where the variable consists of only two categories that exclude each other.

Purpose

The purpose of this study is to discover the most common pathologies of the upper digestive tract, the causes and predisposing factors that lead to their birth and development, as well as to make recommendations based on the results of our study for the general population and that in risk, for a healthier and better life.

Overall Objective

To determine the factors that are thought to be influential in the development and evolution of diseases of the upper digestive tract, to enable their prevention, but also to provide the possibility of timely treatment to avoid suffering and loss of life.

Specific objectives

\-   Identify potential risk factors to reduce the onset or aggravation of clinical signs and improve the patient's quality of life.

\-   Understanding and awareness that factors such as malnutrition, lack of physical activity, sedentary lifestyle, stress, neglect of the early signs of these diseases, delayed diagnosis and treatment affect the evolution and occurrence of complications.

\-   Understand the other effects that these diseases cause throughout the body and life of patients.

\-   To know the latest methods of diagnosis and treatment of these diseases.

\-   To highlight the importance of the absence of complications and the accurate implementation of medication and diet.

\-   Providing the highest quality nursing care to ensure a physical and mental well-being of these patients.

Data Analysis

The most common diseases of the upper digestive tract in the district of Korça for the period 2016-2020
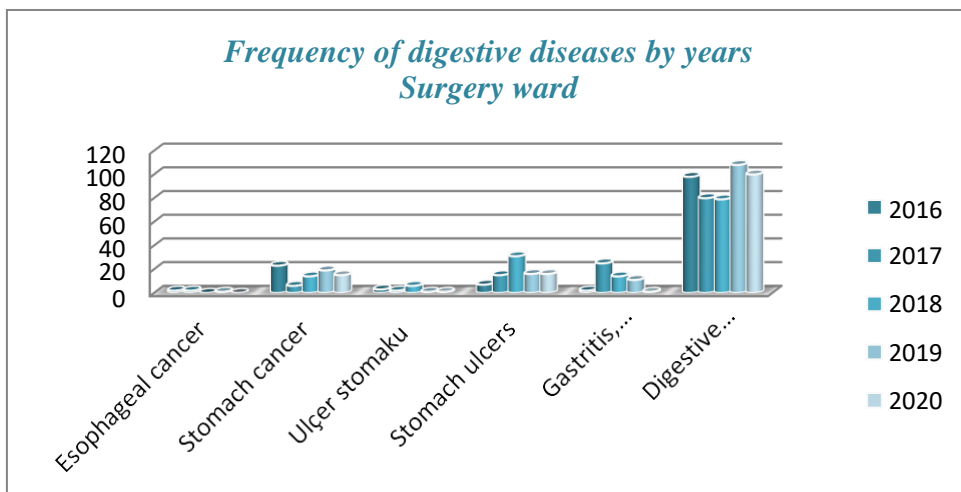
Frequency of digestive diseases by years, Pathology department
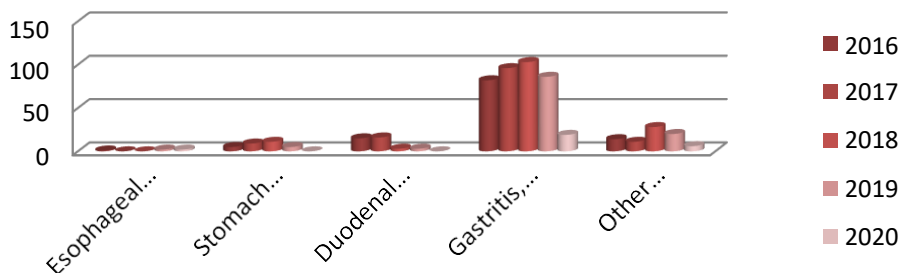
▪ The most common pathology in the Surgery ward for the five years of study is Digestive Hemorrhage and the rarest Esophageal Cancer.

▪ In the Pathology department the most common is Gastritis/Duodenitis and the rarest Esophageal Diseases.

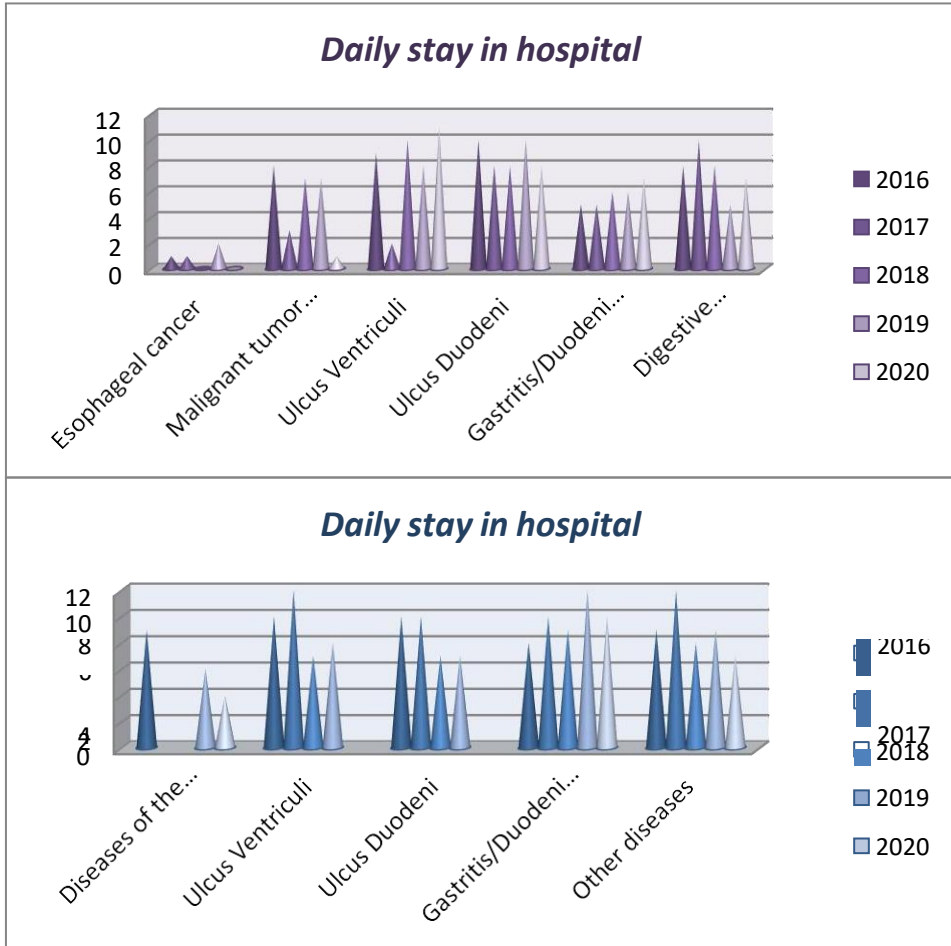**Frequency of diseases of the upper digestive tract based on demographic characteristics,** *distribution by gender.*
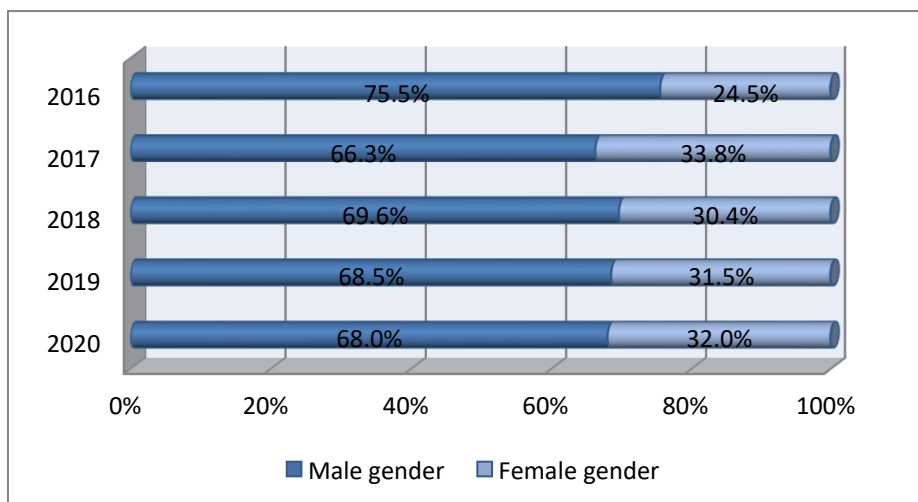
▪ *Male sex* has a greater predominance than female sex to be affected by these diseases.

▪ This is related to many other predisposing factors, risk factors that affect more men than women, such as: diet, abuse of tobacco and alcohol, hereditary factor, etc.

Frequency of diseases of the upper digestive tract based on demographic characteristics, *distribution by age group.*
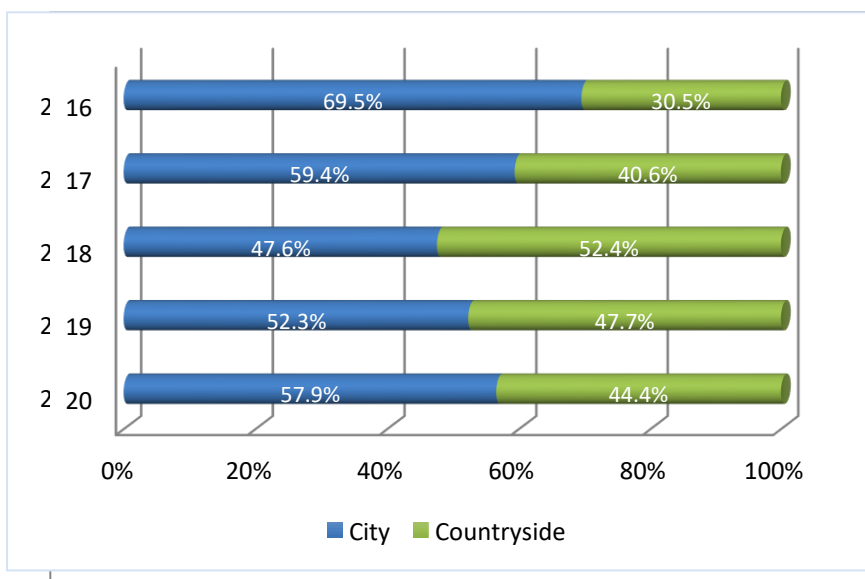
• These pathologies occur in every age group, but the largest number of cases belongs to the age group ***over 65 years*** and the smallest number, *the age group 15-24 years*.

Frequency of diseases of the upper digestive tract based on demographic characteristics, *distribution by place of residence.*

• Most of the patients suffering from upper GI diseases and are hospitalized in the Surgery and Pathology Ward
live in ***the city***, less in *the countryside*.

Average stay of patients according to diseases of the upper digestive tract
for the period 2016-2020.

Surgery Department Pathology Department

Daily stay in hospital

Legend: 2016, 2017, 2018, 2019, 2020

Categories: Esophageal cancer, Malignant tumor…, Ulcus Ventriculi, Ulcus Duodeni, Gastritis/Duodeni…, Digestive…

Daily stay in hospital

Legend: 2016, 2017, 2018, 2019, 2020

Categories: Diseases of the…, Ulcus Ventriculi, Ulcus Duodeni, Gastritis/Duodeni…, Other diseases

- In the Surgery ward *11 days* was the longest stay and *1 day* shorter.
- Patients with Ulcers and Hemorrhages have been hospitalized longer for treatment.
- There were a maximum of 12 days and a minimum of 4 days in the Pathology ward.

Exit status of patients with pathology of the upper gastrointestinal system,
for the period 2016-2020.

- Most of the patients in Surgery have come out of the hospital **cured**. Few patients have lost their lives. The cause for this is hemorrhage, mainly hematemesis.
- Patients with diseases of the upper digestive tract have emerged improved from the pathology ward. Losses of life have occurred rarely, in old age and in case of complications.

Potential risk factor for the GI diseases

Potential risk factor for GI diseases

- Helicobacter Pylori
- Drugs
- Diets
- Tobacco and Alcohol
- Genetic predisposition
- Stress
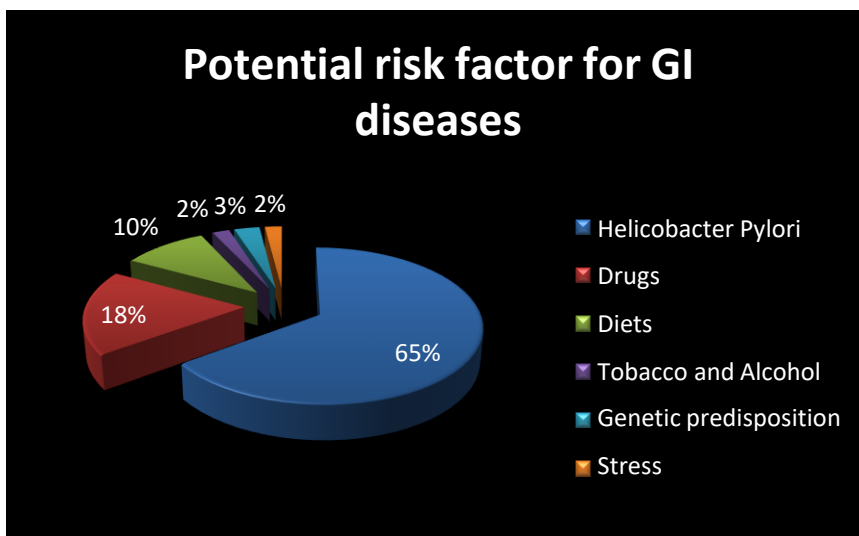
- From the distribution of densities we see that the most common factor (65% of cases) that prevails in the development of diseases of the upper digestive tract is **Helicobacter pylori infection**.

- It is followed by *the use of medications* by 18%, *the use of an unhealthy diet* by 10%, and with less impact we see that it is the hereditary factor, *the use of tobacco* and *alcohol* as well *as emotional stress*.

Localization of the most frequent diseases of the upper gastrointestinal tract
in the Korça Regional Hospital, for the period 2016-2020.

ESOPHAGUS

lower 1/3 of the esophagus 13%

1/3 of the middle of esophagus 87%

STOMACH

Pyloric 38%

Cardia 28%

Corpus 34%

DUODENUM

Bulb of duodenum 100%
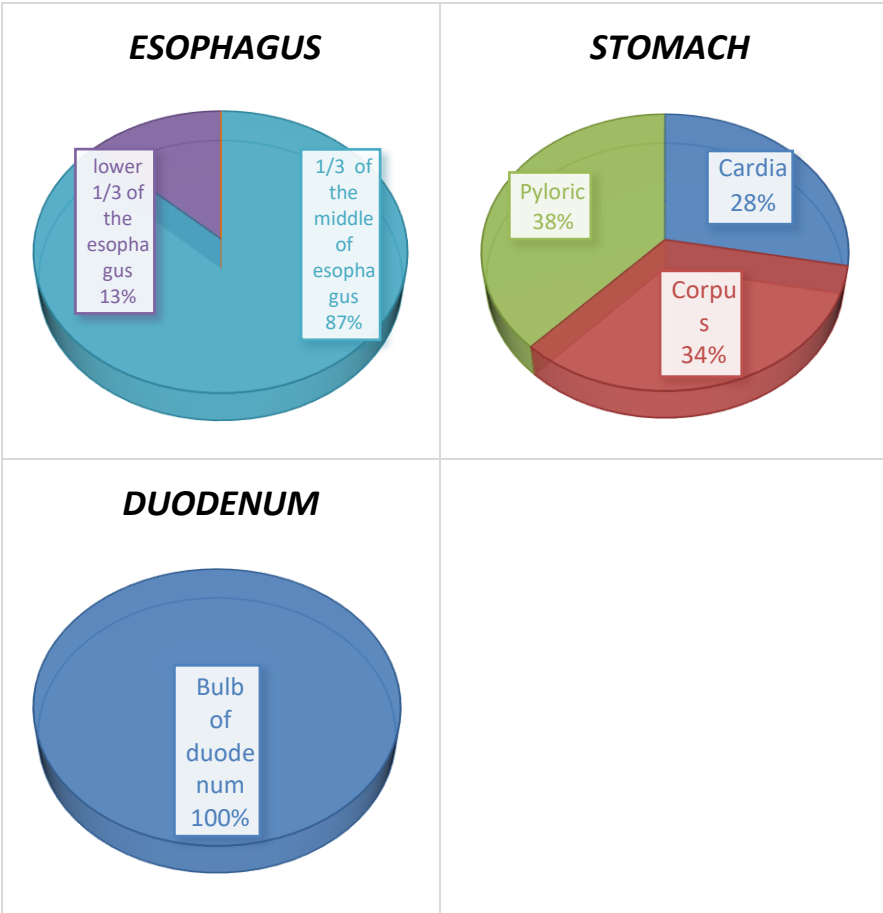
- From the data presented in the graphs above we conclude that the most common diseases of the upper digestive tract are localized in *1/3 of the middle of the esophagus, in the pyloric part of the stomach* and *in the bulb of the duodenum.*
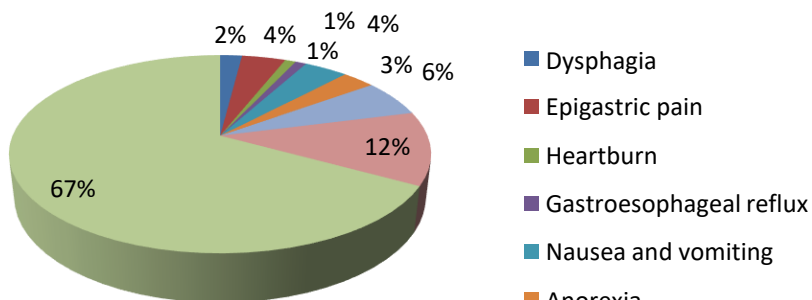- The other parts are less or not affected at all.

Major complications of upper GI tract pathologies

Major complications of upper GI tract pathologies

- Hemorrhage (Hematemesis, Melena) — 44%
- Pyloro-bulbar stenosis — 38%
- Perforation — 15%
- 3%
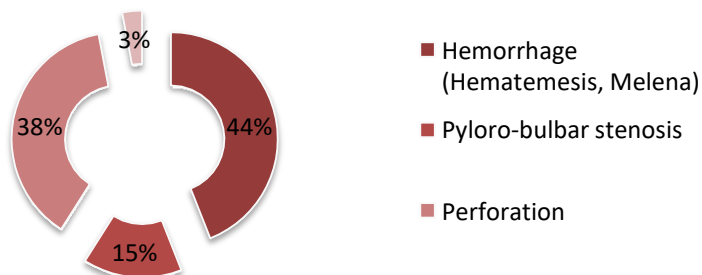
- • *Digestive hemorrhage* occurred more frequently (in 44% of cases) mainly from an Ulcer and Gastric Cancer,

and less frequently from Gastritis/Duodenitis. It constituted a medical emergency in treatment.

- • *Pyloro-bulbar stenosis* was encountered in 38% of patients, *perforation* in 15% of patients suffering from peptic ulcer and *penetration* was a complication that was encountered quite rarely.

The most common symptoms reported by patiens with upper digestive tract pathology

- Dysphagia
- Epigastric pain
- Heartburn — 67%
- Gastroesophageal reflux
- Nausea and vomiting
- Anorexia

(2%, 4%, 1%, 1%, 4%, 3%, 6%, 12%)

- • Patients with pathologies of the upper digestive system complained of **more than two clinical signs and symptoms simultaneously**. Most often they presented to the hospital with

melena and *hematemesis*. They also complained in the hospital about *epigastric pain*, *nausea* and *vomiting*, *anorexia*, but when taking the anamnesis it turned out that these symptoms had started weeks or even months ago and for which the patient had received outpatient treatment.

• Rarely patients complained of *dysphagia*, *heartburn*, and *gastroesophageal reflux*, the most common symptoms of esophageal disease.

Methods of diagnosing pathologies of the upper digestive tract

2% — 2%

28%

58%

10%

■ Plain radiography
■ Barium radioscopy
■ CT scanner
■ Endoscopy
■ Ultrasound
■ MRI
■ Scintigraphy
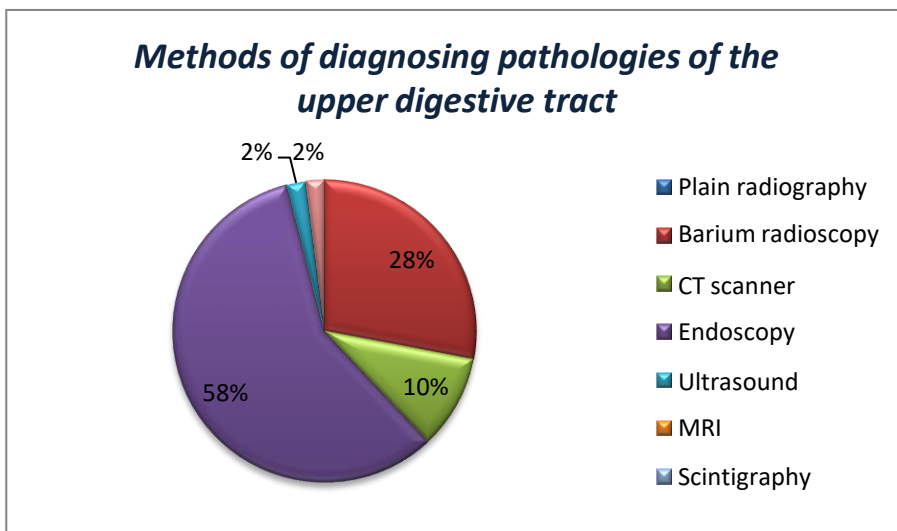
• The most commonly used examination was **endoscopy** (fibrogastroscopy) in 58% of patients.

• *Barium radioscopy* is used in 28% of patients to diagnose esophageal pathology.

• *Computed tomography* was recommended for patients who were thought to have an esophageal or stomach tumor. It determined the type of tumor and its staging.

Endoscopic examinations performed by the Endoscopy Cabinet at the Regional Hospital of Korça for the period 2016-2020.

2...	13.8%	19.3%	2.4%	41.0%	6.7% 5.5% 8.9% 7%
2...	13.2%	20.2%	1.7%	43.9%	6.6% 8.1% 6.3% 1%
2...	11.1%	13.7% 6.3%		43.5%	8.5% 4.0% 7.5% 0.7%
2...	11.7%	16.1% 5.0%		49.4%	5.9% 4.0% 6.2%
2...	11.0%	19.6%	1.8%	45.4%	2.5% 1.2% 13.5%

- Ulçer stomaku
- Ulçer bulbi duodeni
- Ulçer antrio-pyl_orike
- Gastrite
- Ezofagite
- Kancer duodeni
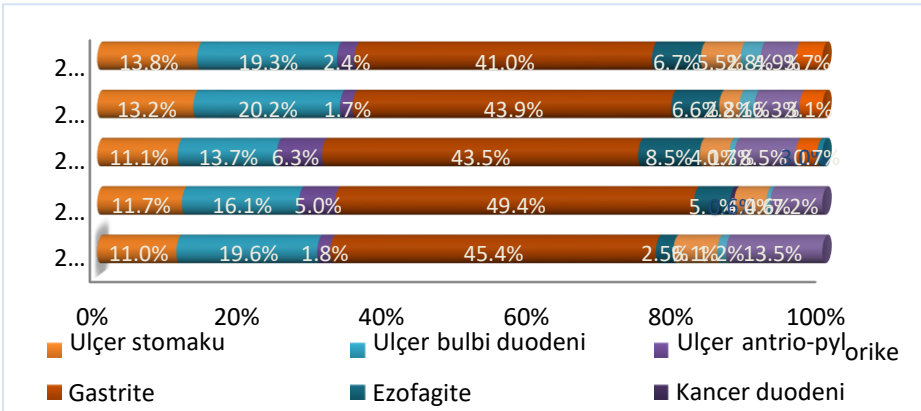
- More endoscopic examinations were performed for *Gastritis*, 541 examinations or about 50% of all endoscopic examinations in a year. 219 examinations were performed for *Duodenal Ulcer* or about 20%. 152 examinations were performed for patients with *Stomach Ulcer* or about 14%.
- Of all the examinations performed during the five years, 92 of them turned out to be normal, without noticing the presence of any disease of the upper GI tract.

Detection methods of Helicobacter Pylori

Detection methods of Helicobacter Pylori

- Blood test
- Breathing test
- Stool test
- Field test
- ELISA tests
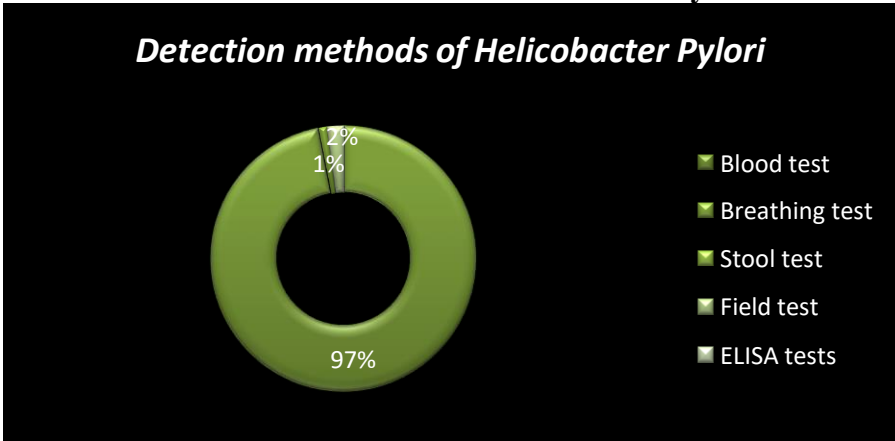
- The most commonly used method for detecting Helicobacter pylori at Korça Hospital is a *serological blood test* that detects active or previous infection.

Treatment of pathologies of upper GI tract
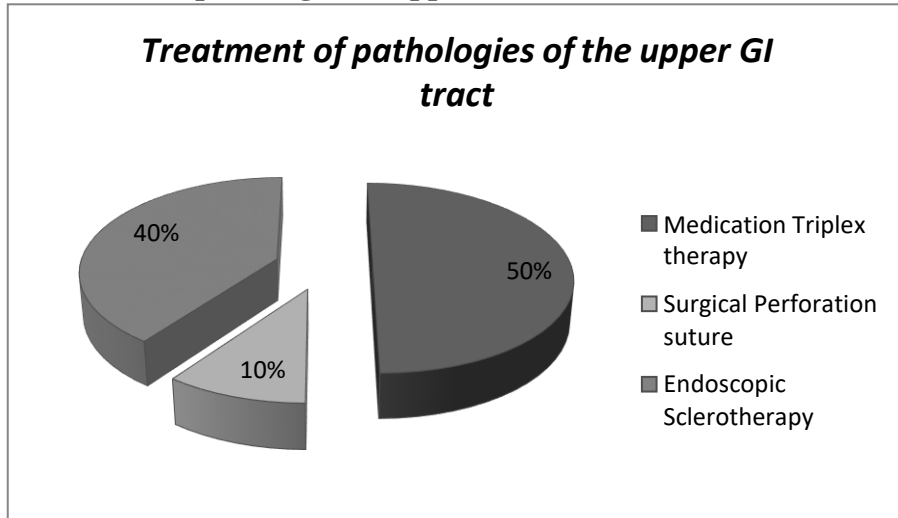
- 50% of patients are treated with ***drug therapy*** where we mention Triplex therapy, which contains an antihistamine drug, a PPI and two antibiotics.
- 40% of patients were treated through *endoscope* with Sclerotherapy, mainly when they had digestive bleeding as a complication and 10% were treated with *laparotomy* for perforation suture, another complication of gastrointestinal pathologies.
-

Treatment methods for Sclerotherapy
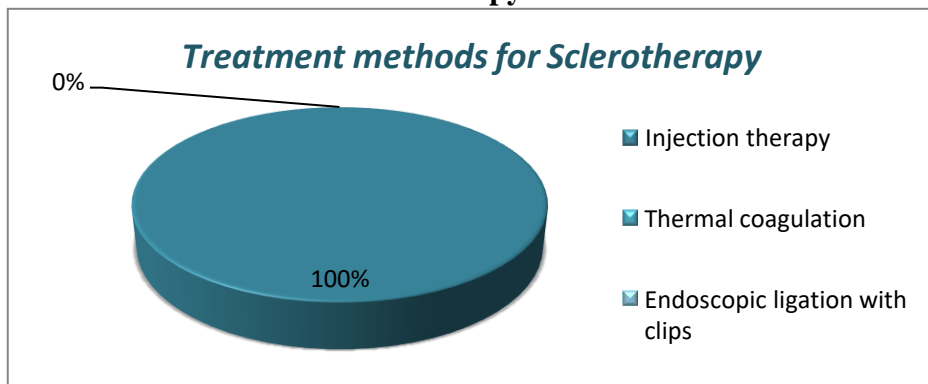
- The only method used for sclerotherapy is ***Suprarenin injection therapy***.

Chi- Square Test Of Indipendence

To test the raised hypothesis we used Cross-tabulation and Hi-Square Test.

From the Cross-tabulation table it appears that the majority of patients diagnosed with Gastritis (90.9%), Ulcus Duodeni (70.6%) and Ulcus Ventriculi (55.2%) *tested positive for H. pylori.*

But 2 out of 3 patients diagnosed with Stomach Cancer have tested negative so in this case we can not conclude that it has the effect of H. Pylori.

Examination for H. Pylori * Crosstabulation Diagnosis

		Diagnosis				Total
		Gastritis	Stomach cancer	Ulcus duodeni	Ulcus ventriculi	
Examination for H. Pylori	negative	Density	1	2	5	13	21
		% in Diagnosis	9.1%	66.7%	29.4%	44.8%	35.0%
	positive	Density	10	1	12	16	39
		% in Diagnosis	90.9%	33.3%	70.6%	55.2%	65.0%
Total		Density	11	3	17	29	60
		% in Diagnosis	100.0%	100.0%	100.0%	100.0%	100.0%

Conclusions

- H. pylori was the main etiological factor of pathologies of the upper digestive tract.
- Digestive Hemorrhage had the greatest incidence.
- Male sex predominated, age group over 65 years and city residence.

- The average stay of patients in the hospital was about 10 days.
- Patients from the Surgery Ward came out in a cured condition, while from the Improved Pathology. Very few patients turned out to have lost their lives.
- The pathologies were localized in 1/3 of the middle of the esophagus, the pyloric part of the stomach and the bulb of the duodenum.
- The most common complications were: digestive hemorrhage in the form of hematemesis and melena, pyloro-bulbar stenosis, perforation and penetration.
- Patients complained of more than two clinical signs and symptoms.
- Endoscopy, Barium Radioscopy and CT were used for examination.
- More endoscopic examinations have been performed for Gastritis and Peptic Ulcer.
- Serological test was used to detect Helicobacter pylori.
- Three main methods were used for treatment: medical, surgical and endoscopic.
- The two main primary prevention strategies are better feeding habits and reduction of H. pylori infection, and secondary prevention, involves early detection of the disease using the endoscopic method as a gold standard.

Recommendations

- Maintain a healthy stomach, without worries and complications.
- Eat a healthy diet with fruits and vegetables.
- Eliminate H. pylori infection.
- Pursue diagnostic and treatment strategies adapted to the needs of populations consistent with the prevalence of H. pylori and disease.
- We recommend continuous follow-up of patients to avoid complications and evolution of pathology.
- Detect signs of Stomach Cancer in time and treat as early as possible to reduce the high mortality associated with the disease.

- We recommend health education and effective acquaintance of the population with new knowledge to ensure stomach health and disease prevention.
- We suggest that further research is needed to investigate diseases of the upper digestive tract and improve their course.

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DETERMINATION OF THE PHYSICO-CHEMICAL CONDITION AND MYCOTOXINS IN FLOUR PRODUCED BY DAJTI WHEAT (SUPER ELITE) CULTIVATED IN THE DEVOLL CITY

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Abstract
Flour has a great use in the food industry but also that of the bread. Therefore, it must be purely from a microbiological point of view and have physico-chemical characteristics according to the allowed international norms. Wheat flour contains bacteria, mold and yeast. The bacteria in flour are saprophytes, but there are also pathogenic microflora that cause foodborne illness. The microflora of the flour depends on the degree of purification of the grain, the grinding, the storage and transport conditions. We analyzed wheat flour Dajti SE (super elite) to city of Devoll. In this study, we determined the moisture and acidity in the aqueous extract (Food Product Analysis) as important determinants of freshness and quality in the flour. Also, the study consists in the determination of the general microflora (with decimal dumps in sterile water and pepton water), but also the microflora for fungi and the isolation and determination of *Bacillus*mesentericus according to the methodologies provided in (Technical Microbiology Practicum). If the flour contains many of these spores they are not destroyed because the temperature in the bread dough during baking is lower than 100 ^{0}C. These cause potato disease in bread. Experimental measurements showed that: Flour moisture varies from 10.5 to 10.6% very good indicator of quality in flour. Acidity in the flour came within the allowed rate, an indicator of freshness in the flour. According to the

microbiological characteristics, the presence of the fungi of the field *Fungi imperfecti* and the warehouse mold: *Aspergillus spp., Penicillum spp.* and *Mucor spp.* which were in a low number from 1 to 8 molds. The number of colonies after dilution in pepton water (cultivated in agar plate terrain) was from 46 to 65 colonies. The presence of *Bacillus*mesentericus in flour was not identified.

Introduction
Wheat flour is widely used in Food Industry. It has the chemical composition starch 70%; proteins 12%; lipids 2%; pentozan 2%, mineral salts 0,5%, water 12%. Flour is suitable environment for development of microorganisms. The microflora of flour depends on the microflora of the grain, the degree of purification of the grain, the way of grinding. The microflora of the flour depends on the conditions of transport and storage conditions.Moisture in flour should be 13%, above this value molds develop and below this value lipid oxidation occurs. Moisture content below 13% in flour does not allow the growth of microorganisms.When the humidity increases to 15% it is favorable for the development of molds, while the value to 17%favors the growth of bacteria. These cause the growth of microorganisms in the flour to cause mold, self-heating or fermentation of the flour.Flour does not undergo the sterilization process, therefore it contains many microorganisms. Microorganisms pass into the grain mass (grain) from the soil, from dust, from raindrops as well as from machinery during milking and collection. The greater the amount of microorganisms in grain (wheat, etc.,), the greater their amount in flour.The microflora of grain and flour is represented by bacteria, molds and less frequently by yeast.Bacteria and fungi found in flour are saprophytes, but there are also pathogenic microorganisms that cause disease and poisoning, ie food poisoning. The interest in practice is the presence in the grain and flour of bacteria of the genus Bacillus spp, especially Bacillus mesentericus, which contains enzymes with very high proteolytic activity, capable of breaking down gluten proteins. The spores of this bacillus are very stable, they resist 109-113 ^{0}C for 45 minutes.If the flour contains a lot of spores of this bacterium these are not completely

destroyed, since the maximum baking temperature in the bread dough is below 100 ^{0}C. Under certain conditions, for example during the storage of bread for 24 - 36 hours in warm premises, the cells of these bacilli develop rapidly in its pulp, they cause the breakdown of the product. This type of disorder is called "potato disease". The flour also contains various putrification bacteria, butyric fermentation that affect the quality of the bread.Also, the development of mold reduces the quality of the flour mass until its complete decomposition. The most common fungi are those of the genus; Aspergillusspp .; Penicilliumspp .; Alternariaspp; Cladosporiumspp ; Fusariumspp .; Rhizopusspp .; Mucor spp.The study consists of:

1- determination of physico-chemical analyzes (general moisture and acidity in aqueous extract)

2- determination of microbiological analyzes:

> a)   determination of the general microflora in the field MPA and microflora for field fungi Saburo (chloramphenicol), after dilution in pepton water and sterile water
>
> b)   b) microbiological analysis for Bacillus mesentericus, after dilution in pepton water

Methodology and Results

    Physico-chemical analysis of wheat flour SE (super elite)

Determination of moisture in flour.

Drying method with thermostat at temperature 105 ^{0}C (Analysis of food products - Bindashi H; Prifti D)

Table 1. Moisture in wheat flour SE

Sample (Flour SE)	Humidity (%)
sample 1	10,6 %
sample 2	10,8 %
sample 3	10,8 %
sample 4	10,5 %
sample 5	10,6 %

Determination of flour acidity in aqueous extract

Acidity is an important indicator, it expresses the degree of freshness in the flour and the conditions in which it is stored and stored.

The acidity of the aqueous extract in flour was determined according to the methodology presented in the literature (Analysis of food products-Bindashi H, Prifti D).

Table 2. Total acidity in wheat flour SE (acidity values in degrees)

Samples (Flour SE)	a- amount of ml of NaOH 0,1 N	Acidity in degrees
sample 1	**0,3**	**0,3**
sample 2	**0,3**	**0,3**
sample 3	**0,3**	**0,3**
sample 4	**0,2**	**0,2**
sample 5	**0,2**	**0,2**

Bacteriological analysis of flour

1. Determination of total microflora in SE wheat flour
Weigh 10 gr of flour for analysis and throw in a conical glass where there is 90 ml of sterilized water.Shake the glass gently for 10 minutes.The first dilution (1:10) is prepared, from which, the method of quantitative dilutions, other dilutions are prepared (1: 100; 1: 1000).From each dilution it is cultivated with the method of cultivation by pouring (cover) from 1 ml of suspension in three parallel plates.For the determination of the total number of bacteria we use the MPA field, while for the determination of fungi the Saburo field with Chloramphenicol (or Capek with streptomycin).After incubating the culture dishes in the bacteriological thermostat (for bacteria) at 37^0C for 24-48 hours, for molds 25-28 ^0C for 4-7 days.The colonies that have sprouted are counted.The flour is analyzed for mold and mesentericus.Dilution of all samples is done in bottles of pepton water.To prepare 1000 ml of peptone ground water you need: 8.5 g of sodium chloride NaCl;1 gr pepton;Boil the ground in a saucepan for 5 minutes and then dispense into a 90 ml bottle and 10 ml test tubes.It is sterilized in the autoclave for 0.5 hours at pressure and stored on the desk for a short time and in the refrigerator or closet for a longer period.Planting is done in Saburo field (antibiotic).How to plant:
In the box weigh on the analytical scale 10 gr sample (flour) and pour into the bottle containing 90 ml of peptone water.After shaking for a few minutes, leave it to rest and with a 1 ml pipette take 0.1 ml of the suspension and pour it into the petri dish.Then Petri's plate is filled with Çapek ground, which is warm enough for the page to endure.Leave to

harden and place on thermostat 24^{0}C for 48 hours.After 48 hours the reading is done.If there is no mold it is marked with 0 / gr.If there is mold, the colonies are counted.

Determination of B. mesentericus in flour
Take 10 g of sample, weigh it on the analytical scale and pour it into the bottle containing 90 ml of peptone water.Mix well and put in the mari bath at a temperature of 65-70 0C for pasteurization.Dilution is done in tubes with pepton water. We can plant the first and third thinning or the first and second dilution on the agar-plate.With a single pipette we take from the contents of the bottle 1 ml and throw it in the first test tube.Then for the next dilution we take 1 ml from the first test tube and throw it in the second test tube and so on.Planting is done in petri dishes with agar – plate. For the preparation of 1000 ml ground agar - plate are needed:1000 ml of distilled water;5 gr of meat extract;10 g pepton; 7.5 g NaCl salt;20 gr agar-agar. Preparation: Boil for 15 minutes under pressure in the autoclave.Adjust pH 7.2 with up to 1.5 ml NaOH, dispense into 300-600 ml bottles and sterilize in autoclave for half an hour.The distribution is then done in petri dishes and the petri plates are stored in the refrigerator.For a sample planted two dilutions.We can plant the first and the second or the first and the third.Pipette 0.5 ml of the dilution, pour into the agar plate and dispense with a sterile dish. Place in the 24 ^{0}C thermostat for 48 hours.
Table 3. Total flour microflora (wheat) SE (super elite), in MPA field and Saburo field, with dilutions in sterile water, 240C, after 48 hours of incubation

Sample	Dilutions	Parallels	MPA terrain	Saburoterrain (chloramfenicol)
			Incubation time	Incubation time
			48 orë CFU/gr , 37^{0}C	48 orë CFU/gr, 24^{0}C

Wheat Flour (SE)	10^{-1} (steril water)	I II Average.	65 63 64	5 5 5
	10^{-2} (steril water)	I II Aver.	60 60 60	5 5 5
	10^{-3} (steril water)	I II Aver.	46 46 46	8 8 8
Wheat flour (SE) (is pasteurized)	10^{-1} (pepton water)	I II Average.	- 	2 2 2
	10^{-2} (pepton water)	I II Aver.	- 	4 4 4
	10^{-3} (pepton water)	I II Aver.	- 	1 1 1

Experimental data show that there is no *Bacillus mesentericus* colony after incubation of samples (water-peptone and pasteurized dilutions), after 48 hours in Agar-plate at 24 ^{0}C.This is an indicator of high quality flour.
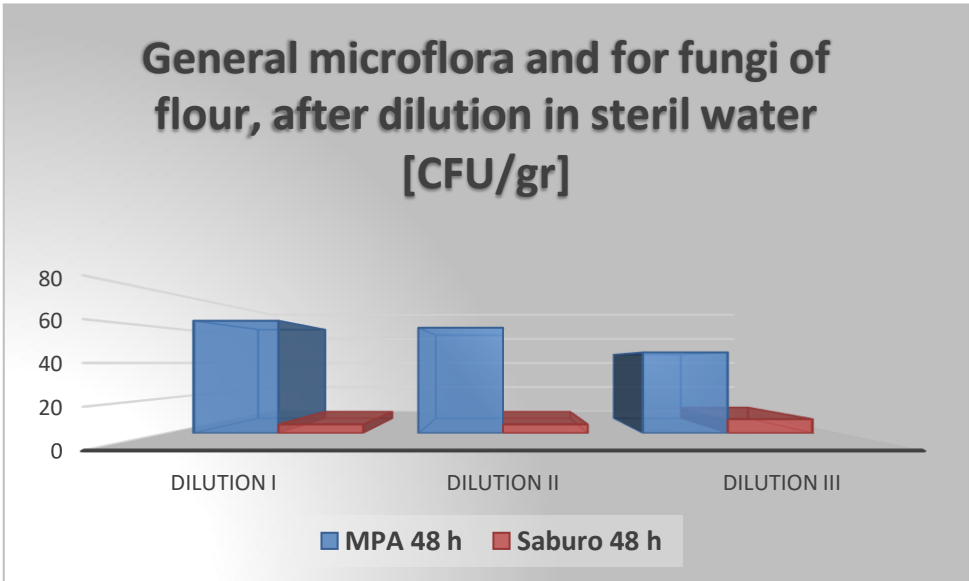
Figure 1. General flour microflora (SE grain (super elite), MPA terrain (37 ^{0}C) and Saburo terrain (24 ^{0}C), diluted in sterile water, after 48 hours of incubation
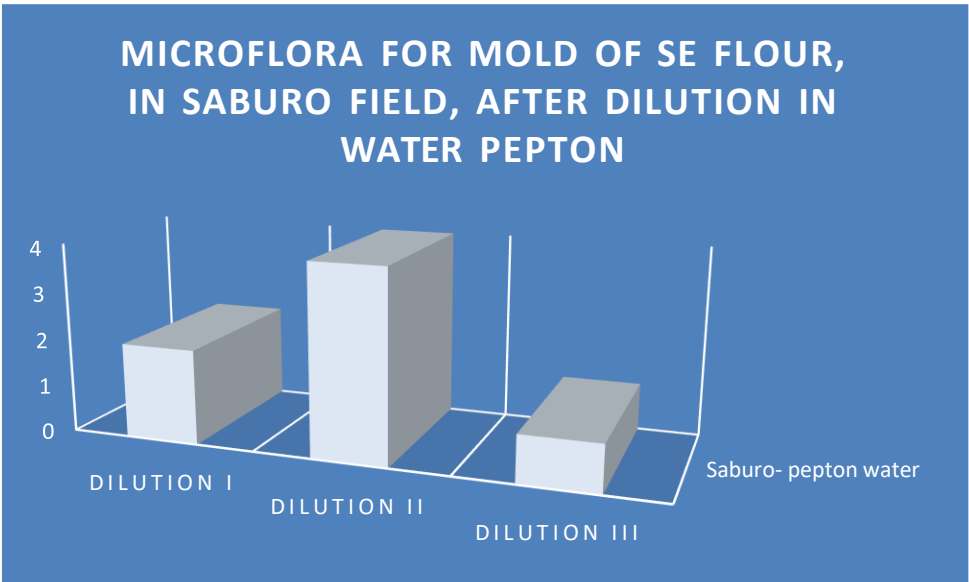
Figure 2.Microflora for SE flour in Saburo terrain (24 ^{0}C) (Chloramphenicol), after dilution in pepton water

Table 4. Total flour microflora (SE), after dilution in sterile water, after incubation at 240 ^{0}C, after 48 hours of incubation, in MPA terrain

| Sample | dilutions | parallels | Incubation time |
			MPA terrain,48 hours CFU/gr , 24^{0}C
Wheat flour (SE)	10^{-1} (steril water)	I	30
		II	30
		Average .	30
	10^{-2} (steril water)	I	24
		II	24
		Average .	24
	10^{-3} (steril water)	I	4
		II	4
		Average .	4
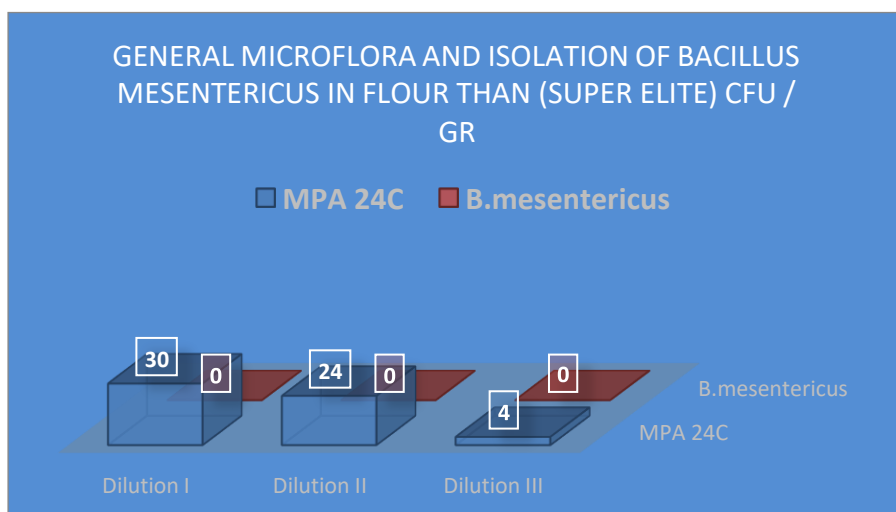
Figure 3. General microflora in plate agar and bacteriological analysis for *Bacillus mesentericus*

From the graphic presentation it is clear, the number of colonies in the agar-plate varies from 4 to 30 CFU / gr.This is within the allowed

norms (<300 CFU).The sample is considered free from microbiological side.Counting the colonies on agar-plate results in 0 CFU / gr *Bacillus mesentericus*.

Photo 1.Microflora for fungi (molds) of flour in Saburo terrain, dilution 10⁻¹,after 48 hours of incubation, at 24°C
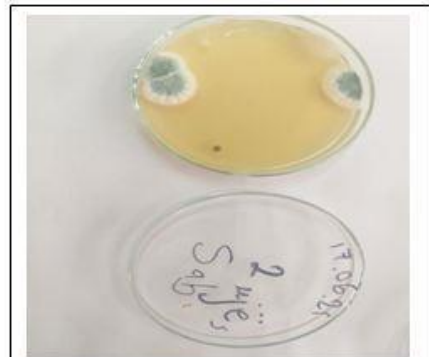
Photo 2.Microflora for molds of flour SE.in Saburo terrain, dilution II,after 48 hours incubation,at24°C

Photo3.During the pouring of the soil into the capture steril
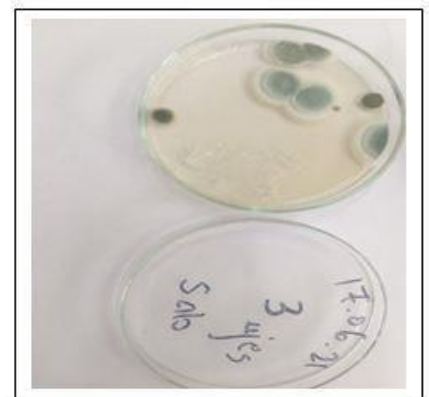
Photo4.Microflora for molds of flour SE, in Saburo terrain, dilution III,after 48 hours incubation, at24°C
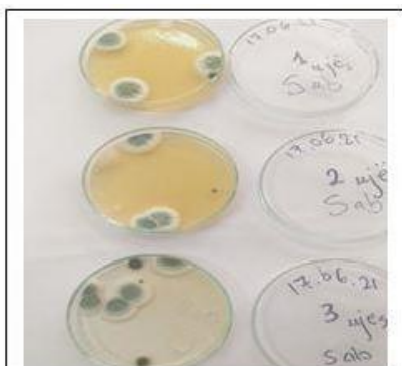
Photo5. Microflora for molds of flour SE, in Saburo terrain, dilution I,II,III (steril water),after 48 hours incubation,at24ºC

Photo6. Microflora for molds of flour inSaburo terrain, dilutionI,II, (pepton water),after 48 hours incubation.at24ºC
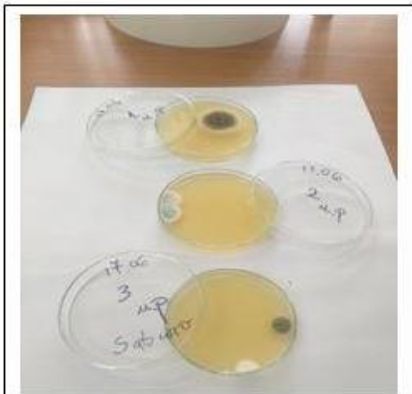
Photo7. Microflora for molds of flour in Saburo terrain, dilutionI,II, III (water pepton),after 48 hours incubation at24ºC
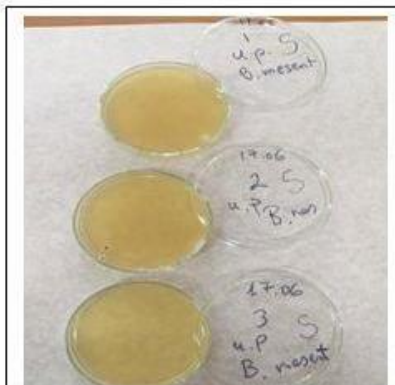

Photo8. Bacteriological analysisin Saburo terrainfor molds andB. mesentericus, dilution I,II,II (water pepton), after 48 hours incubationat 24ºC
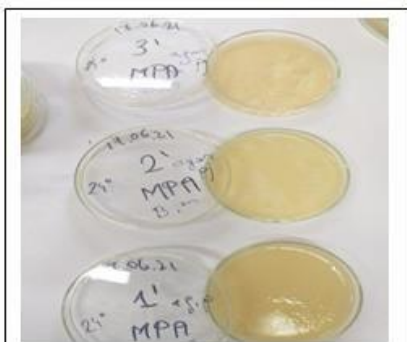
Photo9. Bacteriological analysis in MPA terrain (agar plate) for*Bacillus.mesentericus*. dilution I,II,III (water pepton) (pasteurization), after 48 hours incubationat 37⁰C
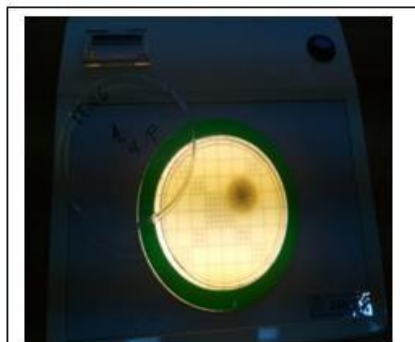

Photo 10. During the counting of the colonies (molds) in electronic apparatus

Conclusions and recommendations

At the end of this study which will follow further, we reached these conclusions:

Physico-chemical analysis:

From the analyzed samples it results:

Humidity in SE wheat flour varies from 10.5% to 10.8%.So, this value is within the allowed norm according to the Standard.(up to 15%)

The total acidity in wheat flour SE (acidity in degrees) varies from 0.2-0.3. This is within the allowed norm according to the international standard (3%)

These acidity values indicate a flour with high freshness (very good quality).

Microbiological analyses

The generalmicroflora in the field MPA (dilution with sterile water), after incubation in the thermostat, 37 ^{0}C, after 48 hours, were counted from 46 to 65 colonies (CFU/gr). So, the values are within the allowed norms (<300 CFU)

Flour is not considered an infection. So it is microbiologically pure.Microflora for fungi in Saburoterrain (with chloramphenicol), after dilution in sterile water, results from 5 to 8 colonies.

They were not isolated *Bacillus mesentericus* in samples of flour SE (Dajti wheat), after dilution in pepton water (pasteurization), in Agar plate, at 24^0C.

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