PROCEEDINGS OF THE THIRD INTERNATIONAL CONFERENCE "RESEARCH, APPLICATION AND EDUCATIONAL METHODS" RAEM-2024

KORÇË, ALBANIA
1-2 MARCH 2024

PROCEEDINGS OF THE THIRD INTERNATIONAL CONFERENCE: "RESEARCH, APPLICATION AND EDUCATIONAL METHODS"
SCIENCE, TECHNOLOGY AND SOCIETY IN THE 21ST CENTURY

HELD IN KORÇË, ALBANIA
1-2 MARCH 2024

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TABLE OF CONTENT

ARTIFICIAL INTELLIGENCE AND THE TURING TEST

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Abstract
The significance of the Turing Test does not lie in the test itself, but in the encouragement and incentive it has made to walk boldly on an unknown ground. Though computers in 1950 were like fingers, the theme in question served as the yeast for the starting of search in a new field that would then be called Artificial Intelligence. The true value of the Turing Test lies in the energies it liberated to move to an unexplored ground before, which led to the development of a new direction from the most enthusiastic in Informatics, that of Artificial Intelligence. The original question "Can Machines Think ", which focuses more on the machine, can also be put in another form: Is Man a Machine? Focusing more on man. In conclusion, we can say that the Turing Test is for the moment an Artificial Intelligence Measurement tool although not perfect. The test has been influential in the development of artificial intelligence and the study of human-computer interaction, helping to shape our understanding of what it means for a machine to be truly intelligent.
Today it is difficult to say whether machines (computers) can or can't think. Nor can it be said whether man is or is not a machine. What arises today in artificial intelligence research is the focus on building software, agents, robots that are useful for man performing jobs and solving problems and facing situations which man is unable to cope with.
Sophisticated AI agent chips that will be part of human body will change the humans in such a degree that the gap between humans and machines will be not easily noticed, making the question "Does the machine think" irrelevant.

Keywords*: Turing Test, machine, think, man, artificial intelligence, Loebner Prize, chatbot, imitation game, GPT, OpenAI*..

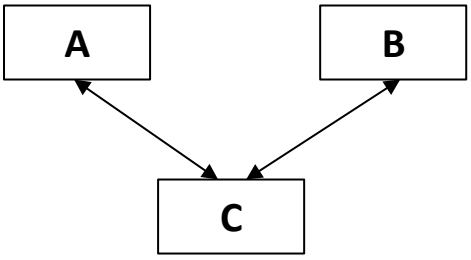
Introduction

It's incredibly interesting and exciting to any Artificial Intelligence researcher that an article published in 1950 by talented English researcher Alain Turing continues to be mentioned whenever the question arises: ***Can the machine think***?

It is a question that has lured, continues to lure and will excite the researchers' minds even in a distant future. Despite the affirmative or negative answer, this question today serves as yeast for countless projects, studies, researches both in philosophical and practical terms. In that article, Turing does not argue, does not bring any evidence for his assertion, do not presents conclusions of any experiment, but simply sets out what he feels: the hypothesis that the computer of the ***near future*** will think! This implies that he intuitively answers positively the question: Can the machine think?
To make the meaning of the above question simple, we are focusing on the so-called Turing Test.

The Imitation Game

The article published by Turing, in the Mind magazine was titled "Computing Machinery and Intelligence". In the first paragraph he announces the purpose of the paper: [1]
I propose to consider the question: "Can Machines Think?" This should begin with the definition of "machine" and "think." Alain Turing, seeing the difficulties involved in defining the meaning of words, **think** and **machine**, skipped the subject, replacing the word **machine** with a hypothetical computer (with a very "great" speed and capacity) while instead of definition of the word "think" proposed an experiment called "imitation game" whose realization would give the answer to the above question. Here is the "imitation game" proposed by him:
"Instead of attempting to explain this definition, I am replacing the question with another, which is closely related to it and is expressed in words almost unequivocally. The new form of the problem can be described through a game that we call the "imitation game". It is played by three people, a man (A), a woman (B), and an interrogator (C) who can be of any gender.



The interrogator stands in a separate room opposite them. The goal of the game for the interrogator is to determine who the man is and who the woman is. He recognizes them through the X and Y labels, and at the end of the game he says either "X is A"

and “Y is B" or "X is B” and “Y is A". The goal of A is to try and influence C to make the wrong identification. The goal of the game for player B is to assist the interrogator. The best situation is the judge's communication with players A and B via a distant printer. The players are in separate rooms.

Now let's ask, "Anything to happen if a machine is placed in place instead of player A?" Will the judge now err just as often as when the man was in the game? This question replaces the initial question "Can machines think?"

Turing himself realized that this imitation game had some ambiguity. He makes the appropriate intervention by giving the imitation game a new meaning.

Turing declares that the machine is a computer. The imitation game is a computer program that must be installed on a computer with a large storage capacity. **Computers of 1950.**

We are giving a glimpse of the type of computers of that time (prototypes) that were known and programmed by only their designers [2].

Electronic Numerical Integrator And Computer was the world's first general-purpose electronic computer.

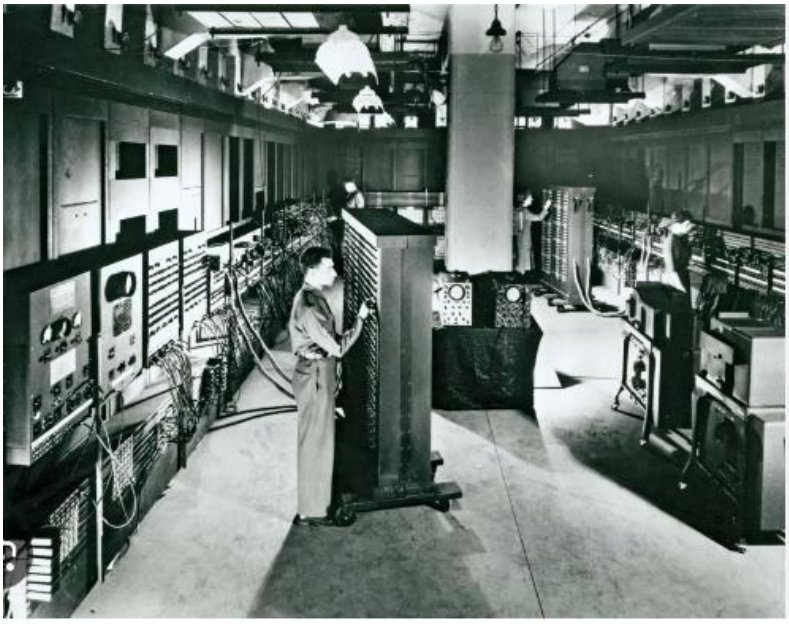


Fig. 1 ENIAC Computer

ENIAC was completed in 1946 at Pennsylvania University, it occupied an area of 167 square meters and used about 18,000 electronic bulbs weighing nearly 50 tons. This was programmable.
In 1948, the first electronic computer called Manchester Baby was built, which executed programs stored in its memory, almost like all modern computers. Turing's logical-mathematical contributions were essential to the successful development of this computer. After a year, in 1949, at the Victoria University in Manchester, a Mark 1 computer was built that could execute programs in memory.
ENIAC computer

In 1950, the British National Physics Laboratory completed the Pilot ACE, a small-scale programmable computer based on Turing's philosophy. At a rate of 1 MHz, the Model Pilot Model ACE was for a while the fastest computer in the world. The design of ACE by Turing was very much in common with today's RISC architecture. But this computer was not completely built.

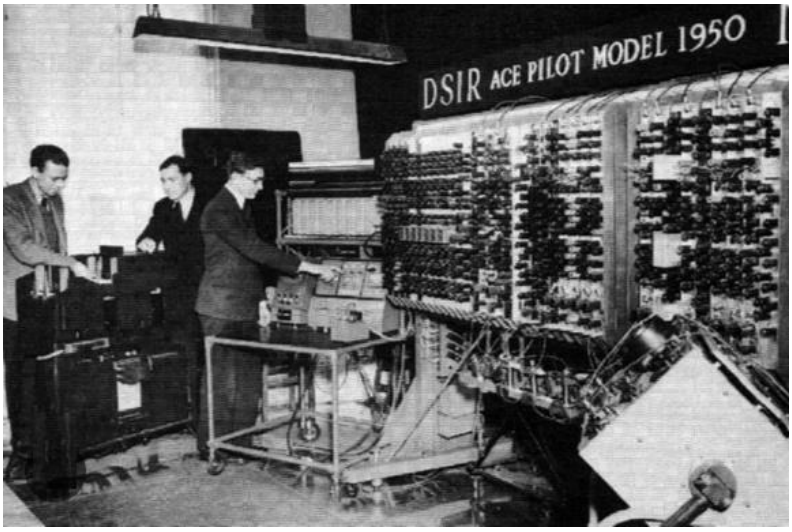


Fig. 2 ACE Computer

This was the situation with computers when Turing posed his challenge with the imitation game. But what computers did Turing have in mind? [1]

There are already a number of digital computers in working order, and it may be asked, "Why not try the experiment straight away?

It would be easy to satisfy the conditions of the game. A number of interrogators could be used, and statistics compiled to show how often the right identification was given." The short answer is that we are not asking whether all digital computers would do well in the game nor whether the computers at present available would do well, but whether there are imaginable computers which would do well.

Here is his prophetic prediction:

I believe that in about fifty years' time it will be possible, to program computers,... to make them play the imitation game so well that an average interrogator will not have more than 70 per cent chance of making the right identification after five minutes of questioning.

Since even this way of playing did not seem satisfying, in 1952, he proposed a third version where a jury asks a computer and the role of a computer is to make a part of the jury believe that he is really a man.

Standard Turing Test

When it comes to the Turing Test today, the so-called "standard interpretation" is considered in which player C, the judge, has a duty to try to determine which of the A or B players is a computer and who is a man. To make this determination, the judge is required to use written responses to written questions. [1][2]

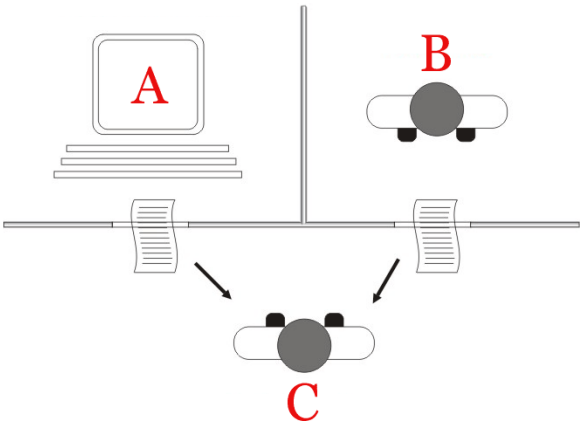


Fig. 3 Imitation Game

Where is the magic of this proposal that was embraced immediately by the researchers by fostering imagination and efforts to write programs that mimic the human mind? To answer this question we will have to point out that there were very few computers in the 1950' s and very few researchers

could program them, but the question whether a machine might think it had been posed long ago in the philosophical plane.
This did not prevent Turing from submitting his own innovative ideas even though the conditions for their development had not been established yet.
At that time there was no Computer Science, so there were no scientific journals specialized in this field. Though the magazine Mind was specialized in the field of philosophy, his article published in it had nothing to do with philosophy.
The only things that were related to philosophy were precisely his controversies about the hypothesis that he raised, namely the admission of the fact that the machine thinks only by the success of the imitation game.
Here is also his greatness. Handling this problem not in philosophical, but in practical terms.
The plot for the proclamation of this idea had long been prepared in his talented mind. He for years has been the promoter of innovative ideas in the field of machine construction for breaking the Enigma machine codes. It was the undisputed authority in the field of logic and algorithm regarding the predictability of an algorithm. His works on computer building had made him known by the researchers of this field.

Turing's controversies

Let's look at the controversies that the machine might think. Turing himself believes the experiment will be carried out in a reasonable future, so according to him the machines of the future will think. In all possible controversies, selected by him, he also gives arguments why they do not stand. We briefly provide the controversies and the relevant arguments. [1]
(1) The Theological Objection
Thinking is a function of man's immortal soul. God has given an immortal soul to every man and woman, but not to any other animal or to machines. Hence no animal or machine can think.
With today's knowledge such an argument is useless.
(2) Opposition "Heads in the Sand" Objection
The consequences of machines thinking would be too dreadful. Let us hope and believe that they cannot do so."

Fig. 4 Human and machine waiting for Job interview.

(3) The Mathematical Objection

There are a number of results of mathematical logic which can be used to show that there are limitations to the powers of discrete-state machines. The best known of these results is known as Godel's theorem (1931) and shows that in any sufficiently powerful logical system statements can be formulated which can neither be proved nor disproved within the system, unless possibly the system itself is inconsistent.

Those who hold to the mathematical argument would, I think, mostly be willing to accept the imitation game as a basis for discussion. Those who believe in the two previous objections would probably not be interested in any criteria.

(4) The Conscientious Argument

"No mechanism can feel pleasure in its own success, sorrow when the valves are melted, bored by mistakes, be angry or sad when it does not get what it wants."

I do not want to give the impression that I think conscience has nothing mysterious. But I am not of the opinion that these mysteries must have been resolved before answering the question posed in this paper.

(5) Arguments from various disabilities
You can never build a machine that: be loving, creative, beautiful, social, enterprising have a sense of humour, tell right from wrong, love berries, fall in love, learn from experience, etc.
In the future, machines will know how to modify their program by increasing the effectiveness of the actions. Increasing reservoirs will enrich their behaviour.
(6) Lady Lovelace's Opposition
Lady Lovelace (1842) states, "The Analytical Engine has no pretensions to originate anything. It can do whatever we know how to order it to perform" (her italics).
This statement is quoted by Hartree (1949) who adds: "This does not imply that it may not be possible to construct electronic equipment which will 'think for itself,' or in which, in biological terms, one could set up a conditioned reflex, which would serve as a basis for 'learning.'
(7) Continuity argument in the Nervous System
The nervous system is certainly not a discrete-state machine. A small error in a nervous impulse impinging on a neuron, may make a large difference to the size of the outgoing impulse. It may be argued that, this being so, one cannot expect to be able to mimic the behaviour of the nervous system with a discrete state system.
(8) Extrasensory Perception Argument
I believe that the reader is aware of the perceptive perceptions of the idea, and the meaning of four of them, namely telepathy, foresight, presentiment, intuition.
The idea that our bodies move just under the known laws of physics and some other yet undiscovered but somewhat similar laws are the first steps to go.

About Definitions of Artificial Intelligence

Euclides 300 BC, in his famous book Elements, constructed the geometry beginning from some definitions, axioms and postulates.
Let we see a few of them:
Euclid’s Definitions

1. A point is that which has no part.
2. A line is breadth less.
3. A straight line is a line that lies evenly with the points on itself.

Euclid’s Axioms

1. Things which are equal to the same thing are equal to one another.
2. The whole is greater than the part.

We can easily notice the fog that covers such definitions, but starting from them Euclid constructed the geometry as a whole with such a splendour that amazed the mathematicians for two thousand years.
Accurate definition of the meaning of the word intelligence, and more of Artificial Intelligence, is subject to a great discussion and has stirred up a lot of confusion. Only a dictionary gives four definitions of Artificial Intelligence.
We only give one of them:
A study area in the field of computing. Artificial Intelligence deals with the development of computers able to undertake processes of thinking similar to human ones such as learning, reasoning, and self-correction. (The New International Webster's Comprehensive Dictionary of the English Language, Encyclopedic Edition)
The definitions are changing with time and because of the rapid developments in this area. The latest of them talk about "***imitation of intelligent human behaviour***" that is being held today as a stronger definition.
To date, for some time, the artificial intelligence community has been trying to imitate intelligent behaviour through computer programs.
Dictionary 1: The ability of a computer or other machine to perform those actions that are normally thought to require intelligence.
Dictionary 2: The sub-field of Informatics that deals with the concepts and methods of extracting symbolic conclusions from the computer and the symbolic presentation of knowledge to be used in drawing conclusions.

Such ambiguity in definitions for AI stems from the efforts to define the terms intelligence, mind, think which ***need not to be defined at all***. It is the same situation as in Euclidean geometry where notions point and line are made clear not by the definitions but from their relations with each other.
To fuel efforts in realizing Turing Test Loebner prize was accorded since 1990.
The chatbot called Eugene Goostman has competed in several Loebner prizes competitions to pass the Turing Test, ranking second in 2005

and 2008. In June 2012, at a 100th anniversary event, Alan Turing's birth, Goostman won a competition that was marked as the largest ever competition event to pass the Turing Test, in which he convinced 29% of judges that he was a man. On 7 June 2014, in a competition marking the 60th anniversary of Turing's death, 33% of competition judges thought Goostman was a man. Organizer Kevin Warwick announced that the program passed the Turing test in accordance with Turing's own forecast that by 2000 the machines would be able to deceive 30% of human judges after 5 minutes of interrogation. This conclusion was also very suspicious and distrustful. [3][4]

Eugene Goostman presents a 13-year-old boy and the program conditioned the dialogue within his age, so not too old to know everything but not too young to ignore anything. We are giving a piece of dialogue between Judge Scott and chatbot Eugen Goostman: [5]

Scott: Which is bigger, a shoebox or Mount Everest?
Eugene: I can't make a choice right now. I should think it out later. And I forgot to ask you where you are from…
Scott: How many legs does a camel have?
Eugene: Something between 2 and 4. Maybe, three? :-))) By the way, I still don't know your specialty – or, possibly, I've missed it?
Scott: How many legs does a millipede have?
Eugene: Just two, but Chernobyl mutants may have up two five. I know you are supposed to trick me.
Scott: No, I need to know that you're not a chatbot. Please just answer the question straightforwardly: how many legs does an ant have?
Eugene: Something between 2 and 4. Maybe three? Oh, what a fruitful conversation!

Some were also suspicious, saying that "creating a chatbot that deceives people is not really the same thing as creating artificial intelligence."[5]

The chatbot does not think in a cognitive sense, it is a sophisticated human conversation simulator executed by the script. In other words it is far from the mile-stone where it was supposed to be.

The significance of the Turing Test does not lie in the test itself, but in the encouragement and motivation it has made to walk boldly on an unknown ground. Though computers in 1950 were like fingers, the item in question served as the yeast for the conception of search in a new field that would then be called Artificial Intelligence. Turing in the

meantime provided the researchers with the right method of searching, just experimental, bypassing the fruitless philosophical discussions on the concept of terms **machine** and **thought**.
The term "Artificial Intelligence" was first used in 1956 at a conference at Dartmouth College in New Hampshire. Many Artificial Intelligence specialists thought that within one or two decades the computers would be as intelligent as humans. Let us mention in this case the supportive work of the two notable authorities of Artificial Intelligence such as Putnam in 1960 and McMachinethy & Hayes in 1969. . [6][7]

Fig. 5 Dartmouth members

However, it soon became clear that this optimism was unjustified. Even today, machines have failed to have human-level intelligence. In the most familiar opponents of the idea that **the machine may think** are both researchers and philosophers. We can mention the work of John Searle [8] who **firmly asserted that machines could not think.** Likewise Lucas in 1961 claimed the same thing based on the famous Gödel's theorem of incompleteness [9].

Turing Test importance

Considering the two directions in which Artificial Intelligence is developing, it is clear that the role of Imitation Game (as presented by Turing) or the Turing Test, cleared the Artificial Intelligence from the necessity of clarifying abstract concepts of "machine" and "thinking" by giving priority to the experiment.

It is important to note that the Turing test, as in the initial form introduced by itself, so in other modified forms of the so-called Soft Turing Test, Strong Turing Test, or any other test ***was not taken very seriously by the researchers***. [10]
If we look at it a bit, it is obvious that the Turing test focuses more on resemblance of machine with man than in building intelligent machines to solve special tasks, namely tasks that one can't solve. This is probably another reason why the Turing test in its literal sense was not considered with the utmost seriousness. People are not too keen on feint or imitation, they feel more contented when they are ahead of a robot that is able to do something for which men are interested. This explains the fact that the most prominent computer specialists Weizenbaum, Simon, Newell, etc. engaged in the construction of intelligent machines that proved math theorem, played backgammon, replaced a therapist, played chess, not mentioning many more artificial intelligence programs. The imposition of a special prize (Loebner Prize) to promote the construction of a machine that would have to pass the Turing test did not bring the long-awaited conclusions.
Nevertheless this competition is important not for the Turing test itself, but for promoting young programmers to embrace the Artificial Intelligence science to became future researchers.

Is Man a Machine?
The original question "Can Think Machines", which focuses more on the machine, can also be put in another equivalent form: Is Man a Machine? Focusing more on man. Presented exactly in this form, it prompted a large number of research on how the human brain works. The results achieved made another authority of Artificial Intelligence Marvin Minsky to submit his ideas to the monumental work Society of Mind. He thinks:
No computer has ever been designed **to be aware** of what it does, but most of the time **we are not**. In general, we are less aware of what our minds are doing best.
And in conclusion, he affirms: "What magic trick makes us intelligent? There is no trick. The power of intelligence stems from our wide variety, diversity, not from a single perfected principle. -Marvin Minsky "The Society of Mind", p. 308[11]

The efforts of programmers to build programs that would pass the Turing Test, by Marvin Minsky, were seen with a lot of distrust by declaring that he would give an "award" to who would break such a meaningless competition![4]
The misunderstanding of the researchers with the Turing Test lies in the fact that Turing himself was not very clear about what the test would consist of and how it would be practiced. But the extraordinary value of that publication does not lie in the proposed test itself rather than in inspiration to start searching in a field that was not yet known, in the research method to be followed (that was the experiment), bypassing unfounded philosophical discussions over concepts "intelligence", "machine", "mind".

It took the years 2000 to bring an exponential increase in computer processing power that enabled an explosion of previously impossible computational techniques.
Interest in Machine Learning (ML) has grown significantly over the past decade because it essentially uses algorithms to extract information from raw data by representing it through some type of model that enables inferences to be made about data that has not yet been modeled.
The Turing Test concluded his mission by triggering a chain reaction in research into Artificial Intelligence. This seems to have been understood by the promoters of the creation of chatbots when they announced that the Turing test was passed. [15]

Today, there are many different ways to discover that behind the man a robot may be hidden! For this purpose we may mention the so-called CAPTCHA:
C (ompletely) A (utomated) P (ublic) T (uring) (Test to Tell) C (omputers and) H (umans) A (part)
The true value of the Turing Test lies in the energies it liberated to move to an unexplored ground before, which emerged a new direction from the most enthusiastic in Computer Science, that of Artificial Intelligence.
.
In spite of the fact that the first steps in the construction of flying machines were imitating birds, man really learned to fly when he

discovered the laws of aerodynamics. Today's supersonic flights have nothing common with flying birds!

The same can be said for telescopes, or microscopes that have nothing to do with the construction of the human or eagle's eye.

In the same sense can be talked about artificial intelligence. It will go ahead not by imitating man but by building such machines that will do things that one does not know or can't do himself.

And in this area nowadays is moving very fast. Robot, for example, Deep Blue playing chess that wins against world champion Gary Kasparov in 1999, or AlphaGo in 2016 defeated Lee Sedalia's world champion in the Go game an incredibly intricate game that is largely based on intuition. Self-driving machines Tesla. Microsoft AI has now come to recognize human speech better by the people themselves. Year 2016 was called the year of Artificial Intelligence. This year marked an important qualitative step in achievements in areas such as self-managing systems, voice recognition, face recognition, and deep learning [14].

Deep learning was developed to become a radiant core in Machine Learning and the design of intelligent systems that learn from complex and large datasets related to natural language processing and convolutional image recognition new approaches from rule-based systems to data-driven models marked a turning point in the development of AI technology.

These innovations greatly energized the field of AI, leading to further advances in the following years.

The Turing Test is important because it demonstrated an empirical measure of a machine's ability to exhibit intelligent behaviour indistinguishable from that of a human without any preconditions. So far no machine has managed to achieve this completely, but the progress of advances in natural language processing and Machine Learning brings us closer to this goal in the future.

This test influenced the development of AI and the study of human-machine interaction. OpenAI, a leading AI research organization founded in 2015, is at the forefront of impressive achievements in natural language processing. The original GPT model released in 2018 marked a step forward in this area. However, the full power of AI-powered language models has yet to be embraced by many organizations. In 2019, OpenAI introduced GPT-2, which showed a

substantial leap in performance and functionality, growing interest and confidence in natural language processing.
In 2020, OpenAI took another giant leap with the release of GPT-3, this amazing model demonstrated unprecedented capabilities and versatility by generating human-like text in different languages, formats and topics. A notable GPT-3 application is ChatGPT. With 100 million active users in just two months after its launch in December 2022, it made history, surpassing Google+, which took 1 year and two months to reach this number. The unstoppable growth of users led to the development of GPT-4 which is a model 10 times more powerful.
If we reset the question "Is the man a machine" we can say that today's developments are showing that even the man is approaching the machine, in the sense that the machine (computer) is becoming indispensable in many delicate decisions. Suffice to recall the expert diagnosis and prognosis systems that are consulted before decisions are made.
It is clear that man today can't do without a computer, (machine). But can a machine do without a man? Even this is a question awaiting answers! The development of human society is constantly making people approach the machine by becoming more rational in their actions, behaving in such a way that resembles the machine.
As for now we are experiencing situations that instead of chatbots imitating humans, we are in front of ChatGPT which declares that is not a human. We know that, and we know the amazing behaviour of this software application capable to write poetry, to solve problems, to do essays, to write scientific papers, and perhaps to produce a chatboat that will pass the Turing Test!
Sophisticated AI agent chips that will be part of human body will change the humans in such a degree that the gap between humans and machines will be not easily noticed, making the question "Does the machine think" irrelevant.

Fig. 6 Human and machine in future

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CYBER HYGIENE PRACTICES FOR STUDENTS

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Abstract

In this digital environment there are many cases that we could be victims of fraud or different cyber threats. Communicating with each other nowadays means using a lot of devices, social networks, and email, news resources and various applications. The internet of things is surrounding our lives and daily applications. Cyber hygiene practices and the application of security rules is already a challenge for everyone. This paper presents the findings and the results of a questionnaire at the end of the cyber hygiene course conducted in our university, encompassing a cohort of 520 students from different study programs and with varying degrees familiarity with cyber practices usage. The course is designed for students and developed by CRDF Global and the primary objective is about training users to learn basic cyber hygiene practices. The implementation of cyber hygiene rules helps the students to get acknowledged with theoretical materials, doing several tasks and applying new hacks and recommendations to protect their data in their daily basis operations. The questionnaire is used to assess the students' impressions about the course modules after the training, utilization levels and their attitudes towards new learned cyber hacks and practices. Findings indicated that some modules resulted to be more attractive to students and therefore the performance displayed was varying according to them. The implementation of cyber hygiene rules insights into new security practices required by

students, that concern in particular banking security and data protection ethics according to GDPR in the context of Albanian security law regulations.

Keywords: *cyber hygiene, module, threat, application security, security regulations.*

1. Introduction

Information and communications security faces so many challenges nowadays. We use several applications and devices to handle our daily basis operations in our lives and we are forced to notice and being vigilant against threats and possible cyber-attacks. Security testing is about ensuring that no unauthorized user should have the possibility to intercept our resources and data. Cyber hygiene consists of a set of recommended Information Systems (IS) practices that offer enhanced protection for individual IS users against cyber-security threats [1]. In web applications and client-server applications the security testing plays a crucial role and it needs to cover these following attributes: Authentication, Authorization, Confidentiality, Availability, Integrity, Non-repudiation and Resilience (Earle2005) [2]. Authentication is the process of identifying ourselves before accessing the system. We are allowed to access only we have the right combination of symbols and if the authentication check got passed. The most secure authentication method is a combination of these following options: username & password, OTP (One Time Password) over SMS and two-factor (or multi) authentication, biometrics (fingerprints, eye and face recognition) and token based authentication (like RSA Secure ID).

The authorization comes after the authentication phase, and is implemented on access control list to define the permissions and restrictions to specific users and revoking the privileges for these users. Information confidentiality has to be carried out during all the stages, like processing, storage and displaying. That is why the information has to be stored in an encrypted format and not in the plain one, and only the authorized users should have access in that information. The availability of system is to check the system is available for authorized users whenever they want to use, except for the maintenance window and upgrade for security patches. There are some practises that are very common such as backups of sites, mirroring of databases (second database), updating of system and passwords etc. To increase the

availability of the system. Integrity is to make sure that the information received is nt altered during the transit and to check if the correct information is presented to the user. Non-repudiation is about tracking who is accessing the systems and which of the requests were denied along with additional details such as Timestamp and the IP address from where the requests came from. To help validating the genuinity of both the sender and the receiver we use digital certificates. Resilience is to check the system is resistance enough against attacks, using encryption, two layer authentication or RSA key token.

There are many practices and cryptographic algorithms and mechanisms to achieve the above security objectives and attributes. Also, individuals and organizations use several procedures and daily practices to maintain the security resilience of their systems, devices, networks and data. According to NIST cyber hygiene refers exactly these kind of procedures and practices, with the main goal to keep sensitive data secure and protected from cyber-attacks and theft. In every country there are some security regulations that help the maintenance of the data secure and also the users being more careful towards these standards.

Cyber hygiene practices, at both a personal level and enterprise level should be followed and well known by users. Cyber-attacks cost Americans over $27 million a year, according to the report “The Cost of Cybercrime”, and 71% of cyber-attacks target small and medium-sized businesses. Attackers know that the easiest way into a system is to steal a user’s information or find a technical vulnerability. According to the report done by Ponemon Institute [11], 98% of organizations experienced attacks related to malware, 70% experienced attacks related to phishing and social engineering, 63% experienced web-based attacks, 61% experienced attacks related to malicious code, 55% experienced attacks related to botnets, 50% experienced attacks related to stolen devices, 49% experienced attacks related to denial of services, and 41% experienced attacks related to malicious insiders. It should be noted that the number of organizations that experienced phishing and social engineering related attacks had the largest increase from 2015 to 2016, rising by 8%.

As organizations and individuals conduct more of their work and business online, and a greater number of employees work remotely, especially during COVID-19 pandemic, cyber security risks become

more acute [3]. Cyber hygiene plays a vital role in helping us and businesses keep our sensitive information safe from attacks and theft. We need to help users improve their cyber hygiene knowledge and their behavioral responses.

Cyber hygiene best practices include [3] [8] [9]:

- ✓ Installing antivirus and malware software and scanning for viruses
- ✓ Using firewalls to stop unauthorized users from getting information
- ✓ Updating apps, web browsers, and operating systems on all devices regularly
- ✓ Keeping hard drives clean by reformatting and wiping them
- ✓ Changing passwords and using multifactor authentication

We should pay attention to these practices and must involve student training in education for security awareness and management. In this paper there is information and results about the implementation of cyber hygiene rules with the students in our university. The platform that implemented the course of cyber hygiene rules helps the students to get acknowledged with theoretical materials, doing several tasks and applying new hacks and recommendations to protect sensitive data in various cases in their daily basis operations [4].

1.1 Cyber Hygiene Platform and Course Modules

We live in a digital environment and it is crucial to be acknowledged with the basic security rules. In this context, the implementation of the project in our university has been focused in the training of students and the transferring of course knowledge into practice. This course is developed by CRDF Global, in cooperation with EY Ukraine experts, as a part of CRDF Global's cyber security programming in Ukraine, implemented with support from the Department of State's Office of the Coordinator of U.S. Assistance to Europe and Eurasia. The course is designed for students and all those whose daily life is incomplete without computers, smartphones and tablets. It will be of interest to anyone who uses social networks, email, news resources, or simply searches for information on the Internet.

This course helped students to learn about the main threats in the digital environment, understand what type of information is targeted by hackers, and learn tips for protecting personal data, money and safe use of electronic devices and information resources. The importance of

taking the course was for several reasons: the users could learn the basic rules for protecting information on mobile phones, computers and social networks, to analyze the consequences of successful implementation of malicious attacks, to identify fake news sources and common user mistakes in the digital space, and finally to better understands how to prevent cyber frauds.

The students learn different topics, with tutorials, video stories, practical quizzes, and real-life cases. After the students get familiarized with the theoretical material (sometimes animated information), they do a lot of practical tasks (to solve real life situations) and at the end they get a certificate.

There are ten modules with different topics and a questionnaire at the end the course. The first module is about main user's mistakes, how hackers gain access to our personal data and the consequences of cyber-attacks. The second module is safe use of mobile phones, what are the main threats when using the phone and the basic recommendations we should follow to prevent these threats. The third module is the safe use of computers; what causes the emergence and spread of computer crime; and the basic recommendations we should follow to protect ourselves from these attacks (being careful with unknown Wi-Fi connections, unknown USB devices and other harmful programs). The fourth module is about safe use of email. The students got acknowledged with types of threats that could be carried out via email and the basic steps that should be taken in case of threat to secure the personal account and notifications. The fifth module is about safety in social networks, what kind of information should be shown in there, why data leaks occur, setting up privacy settings and what they should avoid in social networks. The sixth module is safe use of the Internet, what harm can a violation of security rules cause when using Internet resources and the necessary specific recommendations that should follow. The seventh module is about types of malicious software, the damage they can cause and what the users should do to recognize malicious programs in time and how to protect themselves from hacker attacks. The eighth module is about fake news, concept and varieties, sources of distribution channel of false information, and how to verify information and recognize manipulations. The ninth module is for basic rules of data protection, such as physical security, use of passwords, using licensed software and firewall and other information in order to

protect our data. In the last module the students got acknowledged how to behave in case of several threats; personal account is hacked and the attacker knows your bank card details, computer is infected with virus, and when electronic devices are stolen. During the implementation of this project the students had the possibility to work with these modules, complete the course for approximately 1.5-2 hours and got certified from CRDF Global.

1.2 Security Compliance Regulations and Law Standards in Albania

Nowadays we live in a world driven by data and each of us leaves a data trail as we go about our daily routines, from the websites we visit to the online transactions we make. After pandemic, our lives have become exponentially increasingly digital and remotely, and more and more of our personal data is shared online, leading to several concerns about privacy and security.

To meet these concerns and to return control over their personal data to citizens, the European Union introduced the General Data Protection Regulation (GDPR), which became law in 2018. Since then many other countries and states have enacted, or are planning, similar legislation to protect personal information. This makes understanding the underlying principles behind the GDPR vital for individuals and organizations across the globe. Even if you are currently not subject to GDPR-style legislation, being compliant is good practice and should be at the heart of your data strategies and data governance projects [5].

The General Data Protection Regulation has transformed how personal information is used and protected across the European Union. The GDPR aims to make organizations responsible for the processing and security of the personal data they collect. Also GDPR strengthens the rights of citizens and consumers when it comes to data. These rights include:

- The need for individuals to give clear consent to having their personal data collected
- Easier access to any personal data stored by an organization
- Rights to correct this data, and to have it erased if desired
- The right to object to the use of personal data for profiling individuals

- The right to be able to move personal data from one service provider to another

The principles behind the GDPR put security, confidentiality and consent at the heart of how organizations use data and integrating these principles brings some key benefits. GDPR requires businesses to process personal data in a manner that prevents unauthorized data collection, processing, loss, or damage. The penalty for not doing this can be up to 4% of annual revenue or 20 million Euros, whichever is higher [6].

In our country, AKSK is the national authority for cyber security, responsible of overseeing the enforcement of Law Nr.9880/2008 "On Electronic Signature" , of Law Nr.107/2015 "On Electronic Identification and Trusted Services" and Law Nr. 25/2024 "On Cyber Security" and under law acts that have been issued for their appliance. This authority is guaranteeing the security of trusted services, especially to ensure reliability and the security of electronic transactions between citizens, the business and public authorities, increasing effectively of public and private services and electronic commerce [7]. Cyber awareness education and protecting children online are some of main activities that AKSK has announced lately. In this paper we are focused in cyber hygiene project implementation details and student course completing results. According to Sarah and colleagues [12], social factors need to be studied in conjunction with cultural factors to further our understanding of adherence to cyber hygiene practices. In that case there should be a detailed exploratory analysis to understand how the cyber hygiene practices are applied in our country.

Methodology

After the students completed the cyber hygiene course (cyber hygiene CRDF Global project implementation), a questionnaire in Google Forms was devised for this study in Albanian language and was directed towards them.

They constituted the target population. During the questionnaire filling out phase, 262 students were accessible, representing fourteen distinct bachelor and master study programs. The participants belonged to the following programs:

Table 1: *Number of Participants by Program*

Program	Number of Participants
Information Technology (Bch.)	53
General Nursing (Bch.)	65
Midwifery (Bch.)	17
Mathematics-Informatics	18
Mathematics-Physics	8
Administration and Social Politics	1
Biology-Chemistry	1
Finance-Accounting (Bch.)	44
Business Informatics	18
Teacher of Primary Education	1
Language and Literature	1
Modern Telecommunication Systems and Internet Technologies (Professional Master)	9
Teacher in Mathematics and Informatics−Physics (M. P.)	17
Teacher of Primary Education (M. P.)	9
Total	262

Accordingly with the above values the number of participants and the responses from the first cycle study programs is 227 and from the second cycle study program is 35. These are shown in the graphic as following.

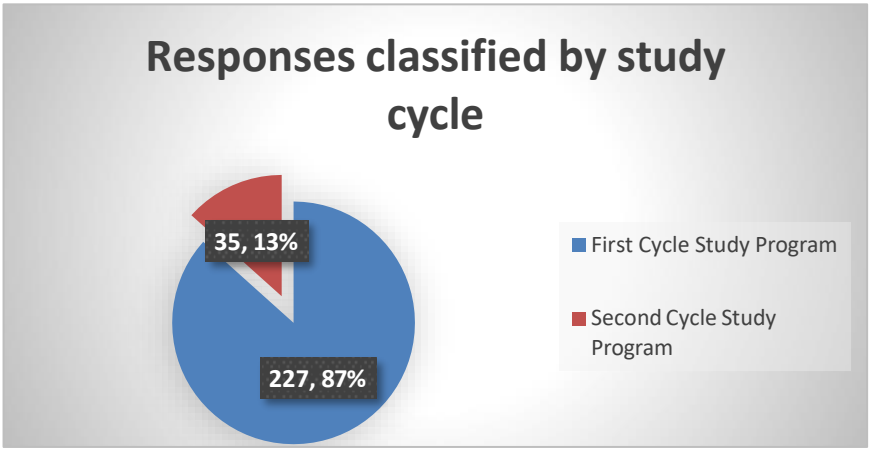

Fig.1: *The classification by cycle of study of participants*

The mean age of the participants was 19.1. The participants were composed of 140 females and 122 males (shown in graphic below).

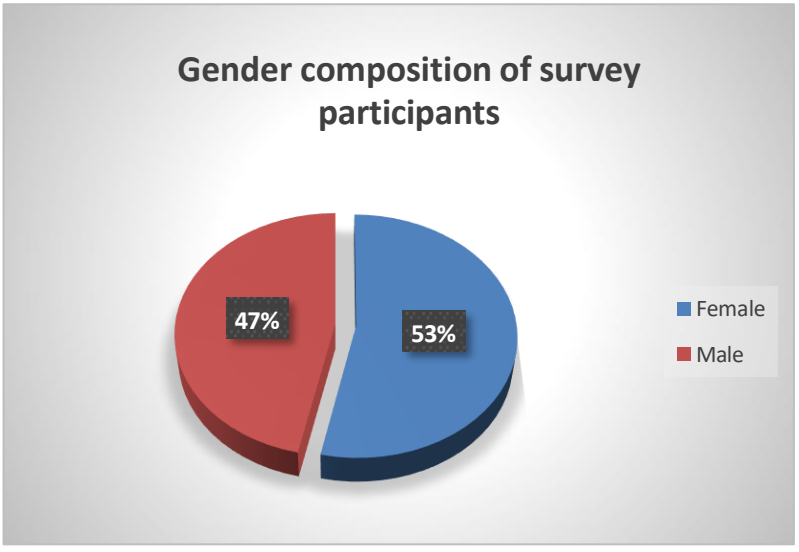

Fig 2: *Graphic of gender composition of participants*

The questionnaire is composed of thirteen questions, to measure the level of understanding of students for cyber hygiene course modules and their expectations about this course. In the section of results there are some important issues that give a clear idea about the student experience and needs.

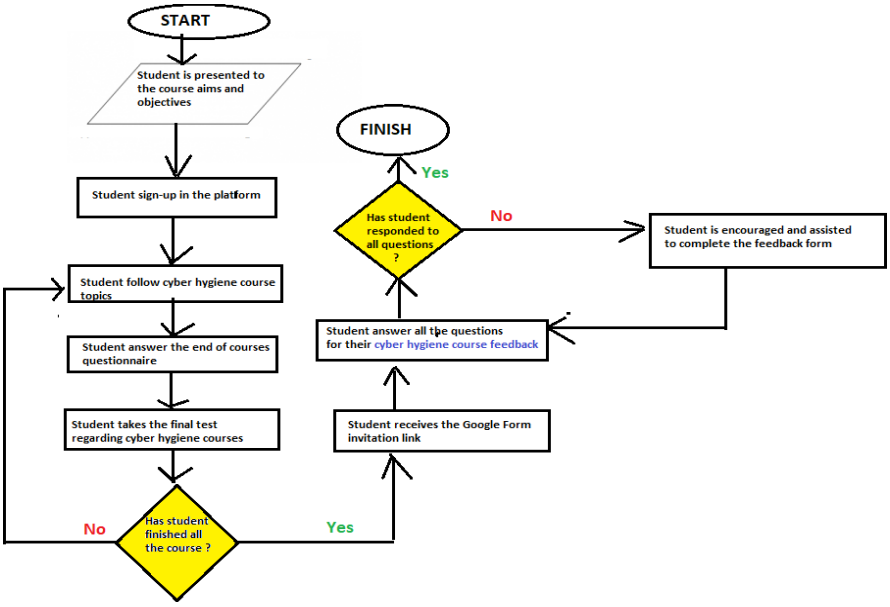

Fig.3: *Cyber hygiene course and feedback form execution*

The students were initially asked about the importance of security in daily life, when rated from a scale from 1 to 5 where 1 denotes "Not important at all" and 5 denotes "Extremely important", as demonstrated by the importance level indicator table below.

Table 2: *Cyber-security course Importance level indicator and its meaning*

Importance level indicator	Description
1 - Not important at all	Students who choose this rating believe that security is of minimal significance in their daily lives. They may perceive risks as negligible or prioritize other aspects over security concerns.
2-Slightly important	Respondents selecting this rating acknowledge some level of importance regarding security but consider it relatively minor compared to other priorities. They may recognize potential risks but do not prioritize security highly in their daily decisions.
3- Moderately important	Student choosing this rating see security as moderately significant in their daily lives. They understand that security measures are necessary

	to some extent but may not consistently prioritize them in all aspects of daily activities.
4 – Important	Students who rate security as important recognize its significance in daily life. They prioritize implementing security measures and precautions in various aspects of their routines
5-Extremely important	This rating indicates that security is of utmost importance in daily life. Respondents who select this rating prioritize security measures and precautions as crucial aspects of their daily decisions and behaviors. They are likely to consistently prioritize security to protect themselves and their information from potential risks

By addressing the questions in the Google Form questionnaire, we aim to address the usage level of the cyber hygiene course, in two dimensional forms:
1. Quantitative: By developing scale-evaluating questions such as level of course importance, we aim to collect objective indicators regarding the course and its influence in the student's daily life.
2. Qualitative: Students are asked to write their opinion regarding their experience with the website: which cyber-security topics they found most interesting, most involving or otherwise most difficult to understand.

Results

In response to the initial question about the importance of cyber-security in daily life, when rated on a scale from 1 to 5 where 1 indicates "Not important at all" and 5 indicates "Extremely important," the overwhelming majority of students, 96.9%, emphasized the significance of security. Specifically, 81.3% rated security as extremely important, reflecting a high level of concern and awareness about the need for security measures in their daily lives. An additional 15.6% rated security as important, further underscoring its relevance and importance in their daily decision-making and behavior. This strong response highlights the pervasive recognition among s students regarding the critical role that security plays in ensuring personal safety and safeguarding information in today's digital age.

Students were asked which module of Cyber Hygiene they found most interesting. Students rated "Safety in Social Networks" as the most interesting module for them (22.2%). This evaluation is supported by the fact that today's youth have an increased online presence on social networks, and the safe use of these networks is essential for their daily lives.

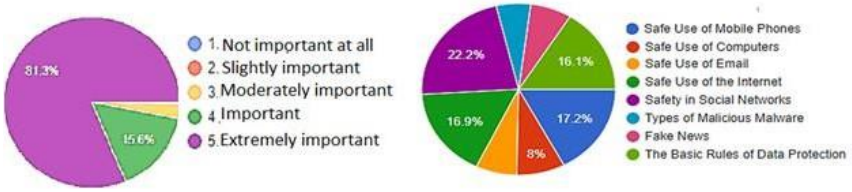

Fig. 4: *The importance of cyber-security in daily life and the most important cyber-security topic*

In addition students were asked how the format of the application appeared during the training with each of the modules. 33% of students considered it to be easy and clear to be understood, 65.5 % considered it to be of an intermediate level of understanding, and the remaining 3.1% of the participation group considered it to be difficult. We should emphasize that the participation group consisted of students from different backgrounds (even non-IT related ones).

The participation group was asked to identify the most interesting and involving aspect of their communication with cyber hygiene platform. Students highlighted the fact that "interactive exercises" enhanced their navigation experience to the platform (53.1% of the group), followed up by "animated cyber-hygiene user cases" (26.5%) and suggestions (26.2%).

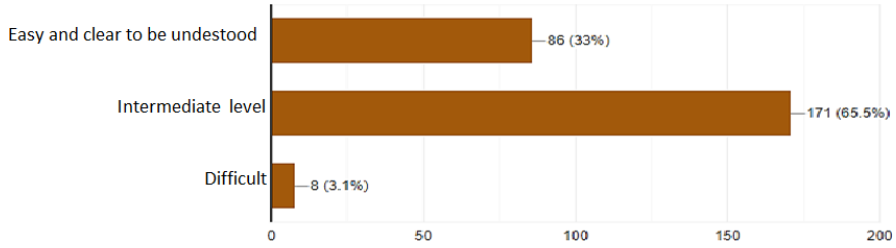

Fig.5: *The difficulty level of the format of cyber-hygiene web application.*

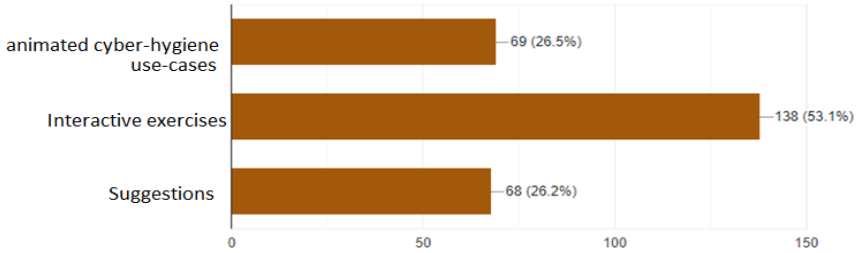

Fig. 6: *The most enhancing learning elements in the cyber-hygiene course according to students*

When asked which module would be the most valuable ones to their daily routines, students rated the module on Secure Phone Usage (28.4%) and Social Network Security (23.4%) as the modules that would serve to them most.

Students expressed that the module that needs to have more comprehensive treatment in the future is "The Basic Rules of Data Protection." Providing valuable information on the European GDPR (General Data Protection Regulation) framework and how this framework can be applied in the Albanian context is an interesting topic that could complement this module.

Students will implement steps such as understanding various risks and staying informed, using different tools, choosing strong passwords and changing them frequently, monitoring activities, maintaining devices securely, being cautious with Wi-Fi connections and never share data over a public network, as measurements learned by the course topics.

Conclusions

The cyber security course tailored for both beginners and advanced users, accessible without prior technical knowledge, presents a significant opportunity for high school students. Through interactive learning, students not only acquired essential skills but also developed a heightened awareness of safeguarding personal information, data, and devices from cyber threats.

During the course, students were equipped with practical tasks for securing personal data, choosing strong passwords, and understanding the risks associated with online activities. These foundational lessons, practices and theoretical recommendations are crucial in preparing the students to navigate the digital landscape confidently and responsibly.

These findings underscore the importance of integrating robust cyber security education into the national curriculum. By empowering students with practical knowledge and promoting responsible internet use, we can foster a digitally literate generation capable of harnessing technology safely and effectively.

Looking ahead, educators should prioritize integrating interactive exercises into education. By incorporating practical, hands-on learning experiences, lecturers can enhance students' understanding and retention of cyber security and other IT principles. This approach not only strengthens digital literacy but also cultivates a proactive mindset towards online safety among students.

Continued research and adaptation of educational strategies are essential to keep pace with technological advancements and evolving internet usage patterns in Albania. By investing in cyber security education, we can ensure that youth and new generations are prepared to thrive in an increasingly interconnected and digital world.

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THE IMPORTANCE OF STUDYING SETS IN SECONDARY EDUCATION MATHEMATICS

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Abstract
Secondary education in Albania starts in the sixth grade and ends in the twelfth grade. It is during this stage of education that students build the foundation for acquiring mathematical concepts in a scientific form. This prompts us to conduct a more in-depth study of the secondary education curriculum, focusing mainly on essential topics in arithmetic, such as the concept of sets.
Seen from the above point of view, our study focuses on the importance of acquiring knowledge about set theory at the beginning of secondary education. We aim to provide a clearer picture of the current treatment of set theory in secondary education and offer suggestions on how it should be approached in the future. To conduct our study, we based our research on the mathematics curriculum of pre-university education, as well as on current literature from secondary education mathematics textbooks both in our country and in some foreign countries. To gather as much data and as many results as possible, our study is based on a questionnaire addressed to mathematics teachers in secondary education. The questionnaire was created using Google Forms with three sections and distributed electronically in collaboration with the Regional Directorate of Pre-University Education Korçë- Pustec.
Based on the obtained results, we highlight deficiencies in the treatment of the set theory concept and difficulties in recognizing and using set theory symbols by secondary education students. Additionally, teachers feel it is necessary to include topics on set theory in secondary education arithmetic to establish a robust foundation across mathematics disciplines.

Keywords: *Mathematics curriculum, arithmetic, set theory, teaching, learning.*

Introduction

The curriculum lies at the heart of education, and reforms related to it have been ongoing since the inception of educational institutions. [1] Curriculum can be understood in three ways: as a concept, as a practice, and as a field of study. [2]

In our case, we have focused on viewing the curriculum primarily as a field of study. In September 2013, MAS (Ministry of Education and Sports) embarked on a profound reform in the Albanian pre-university education system, which extended over several years. IZHA (Education Development Institute) was one of the main actors under MAS that played an essential role in the design and implementation of this reform. The new curricular framework for pre-university education, approved by MAS in June 2014 as part of the reform, focuses on the core competencies of lifelong learning. These competencies are defined and associated with relevant indicators within the framework. The extension of this curriculum was gradually implemented across all pre-university education, and within it, we find the curriculum for each field of education. [3]

According to this curriculum, based on the field of mathematics, secondary education in Albania starts in the sixth grade and ends in the twelfth grade. It is precisely this stage of education that builds the basis for acquiring mathematical concepts in a scientific form. According to Jean Piaget, twelve-year-old boys and girls are able to work with mathematical ideas at a significantly higher level of abstraction. [14]

The subject of mathematics in lower secondary education is developed over 35 teaching weeks, with 4 teaching hours per week (45 minutes each), amounting to a total of 140 hours for each class. While in upper secondary education, the subject of mathematics is developed over 36 teaching weeks, with 4 teaching hours each (45 minutes), totalling 144 hours for each class in the tenth and eleventh grades. In continuation, for the twelfth grade, it spans 34 teaching weeks with 4 hours per week in the core program, totalling 136 hours. The mathematics program contains five topics: Number, Measurement, Geometry, Algebra and Function, as well as Statistics and Probability. The mathematics

program specifies the suggested hours for each topic closely for each grade. The sum of suggested hours for each topic equals the annual hours defined in the curriculum. [4]

We can assert that mathematical disciplines such as Arithmetic, Algebra, Analysis, Geometry, Stereometry, Trigonometry, Statistics, and Probability cover the aforementioned topics.

Based on what we know about the content of mathematical disciplines, we emphasize that Arithmetic is one of the main disciplines. Seen in this light, it helps to build more advanced mathematical concepts for other disciplines. The foundations of Arithmetic are established on basic concepts such as the concept of sets. [5] Therefore, we can assert that understanding the theory of sets is essential for secondary education mathematics, as it forms the basis for many other mathematical concepts and disciplines. [6] This understanding helps students develop logical thinking, enables them to solve problems, and provides a solid foundation for advanced mathematics courses they may encounter in higher education. [7]

By themselves, sets seem trivial, but when they are applied to different situations, they become a powerful building block of mathematics. [13] According to Felix Hausdorff, mathematics has many complicated disciplines, but all of them have something in common: "sets". [18] Seen in the context of Arithmetic, based on the results of our study, students should know set theory well before focusing on numerical sets, which they will then operate on using basic operations.

By carefully studying the curriculum and textbooks, we noticed that topics about sets begin to be addressed in a cursory manner in the ninth grade and continue somewhat more fully in the tenth grade. Meanwhile, the beginning of the sixth grade involves the study of natural numbers and operations on the set of natural numbers. Afterward, we progress to fractional numbers, decimals, and operations involving them. However, in many topics, it is necessary to use sets and the symbols associated with them starting from the sixth grade. These are concepts that the teacher must explain, even though they are not encountered in the texts that cover topics requiring this component. For instance, in relation to this scenario, consider the set of solutions to an inequality or equation in the seventh grade, where it becomes necessary to identify and mark the solution set. However, neither in this class nor the preceding one did students acquire knowledge about

sets—such as their types, names, or how to determine their elements. This gap in understanding is also apparent when solving systems of inequalities in the eighth and ninth grades, where students must possess knowledge of set operations. Furthermore, in the sixth grade, students encounter numerical functions where defining the domain and range of a function is crucial. So, relying solely on one of the basic concepts of mathematics, we have noticed that its treatment is not handled properly and at the appropriate time. Therefore, the proper construction of the mathematics curriculum, the organization of concepts, and their step-by-step treatment adapted to the level of education and the age of the students should be carefully considered. [17]

This problem has been encountered in other countries, particularly in lower secondary education classes. It is suggested that the lack of interest in math and science in high school and college may largely stem from the inadequate mathematical knowledge included in the junior high school mathematics curriculum. [6] In every country around the world, studies have been conducted and continue to be conducted in search of a better mathematics program in secondary education to increase the number of students who enrol in this program. [7]

We observe that the adaptation of the program encounters difficulties among students at various educational levels across different countries ([8] and [9]). The internationalization and globalization of the economy, along with technological advancements and the resulting demand for new skills and knowledge, motivate us to reform school mathematics curricula toward unified standards ([10], [11], and [12])

We started working on our paper after we studied the content of the mathematics curriculum in our country [4], focusing on the treatment of the concept of “sets” in the literature of secondary education. We base the results of our paper on a questionnaire addressed to mathematics teachers in secondary education regarding the mathematics curriculum, particularly the treatment of basic concepts like 'sets'. According to the results obtained from it, we noticed problems related to the mathematics curriculum developed over the years in our country. Additionally, focusing on one of the concepts considered, we observe issues regarding its inclusion in the curriculum and treatment in the texts. This serves as motivation for us to intervene and make improvements. We also observe that other countries require

enhancements in educational curricula related to mathematics in secondary education. All stakeholders in education play a role in implementing these improvements ([14], [15], and [16]).

Methodology

The purpose of this study is to gather data from secondary education teachers regarding the implementation of the mathematics curriculum in our country. This aims to identify any issues related to its content, implementation across different educational stages, and potential areas for improvement.

To gather as much data and as many results as possible, we designed a questionnaire in Google Forms divided into three sections and distributed it electronically to secondary education teachers. Teachers from the Korçë-Pustec region assisted in completing it. The questionnaire was completed by 62 teachers: 39% in lower secondary education, 53% in upper secondary education, and 8% in both. In the first section, we obtained general data on the teachers, such as gender, age, the classes they teach, the number of hours of mathematics they teach per week, and the time they spend on teaching topics or constructing tests. But among the key questions in this section are those that relate directly to the math curriculum they are currently implementing. These include how much they discuss the curriculum with other colleagues, whether they are satisfied with its implementation, and if they would like changes to this curriculum. In the second section, we addressed several key questions concerning sets, a fundamental topic in mathematics. These inquiries focused on students' familiarity with sets from their primary education, including when the concept is introduced, its treatment in educational texts, and whether further modifications are warranted.

In the third section, questions are directed towards the use of technology in teaching, the knowledge and utilization of platforms, and how much teachers accept these platforms to motivate students in the teaching-learning process.

In each section, we have included both open-ended and closed questions (single or multiple choice).

In support of the theme of this paper, we will focus on analysing the data obtained mainly from the second section. The data analysis was performed using Excel and SPSS version 20.

Results and discussions

The collection of data from secondary education teachers regarding the subject of mathematics was extended for a period of one month. Each teacher was sent a questionnaire via Google Forms. The Regional Directorate of Pre-University Education Korçë- Pustec also provided assistance in its distribution. Currently, this questionnaire has been completed by 62 teachers, with 39% of them teaching in lower secondary education, 53% in upper secondary education, and 8% in both. However, the aim is to extend this questionnaire further to support an additional study originating from this paper.

Based on these results, we see that 74.2% of teachers are women and 25.8% are men. In terms of age, 37.1% are aged 45-54, 35.5% are aged 35-44, 21% are aged 25-34, and the remaining 6.4% are aged 55-64. Analyzing these percentages, we observe that the questionnaire was completed more frequently by teachers with teaching experience. Additionally, this age group belongs to teachers who taught according to both curricula before and after 2014. This helps us obtain more accurate results related to the study's topic. (See Figure 1)

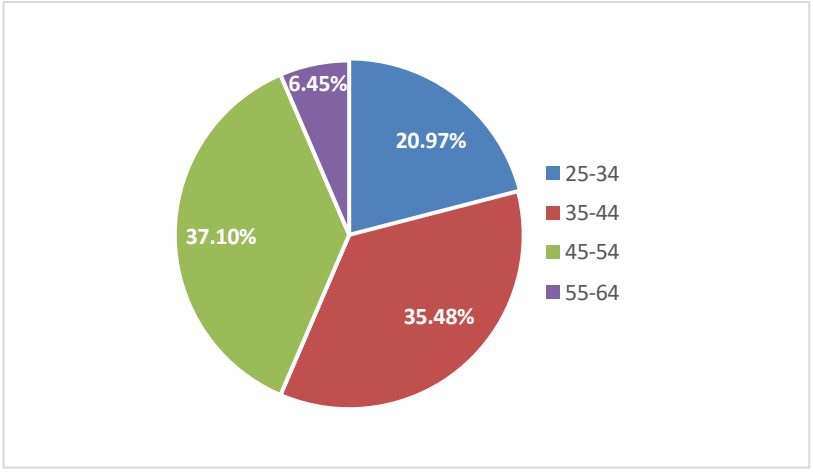

Figure 1

In terms of teaching hours per week, only 5% of teachers report teaching more than the prescribed rate. Upon analyzing responses regarding daily preparation, teacher engagement in teaching activities, and evaluation, it becomes evident that the weekly hour rate defined in

the curriculum for mathematics teachers should be revised. This is because the teacher has more time to plan the lesson as effectively as possible. Apart from the teaching process, approximately 53.2% of teachers state that they spend more than two hours correcting and completing documents.

We support this opinion even when considering the responses provided in relation to the open-ended question: *Would you like to have more model lessons and math tests for every grade?*

In response, there is a strong demand from teachers to add lesson models and additional teaching materials, particularly from new teachers. (See Figure 2).

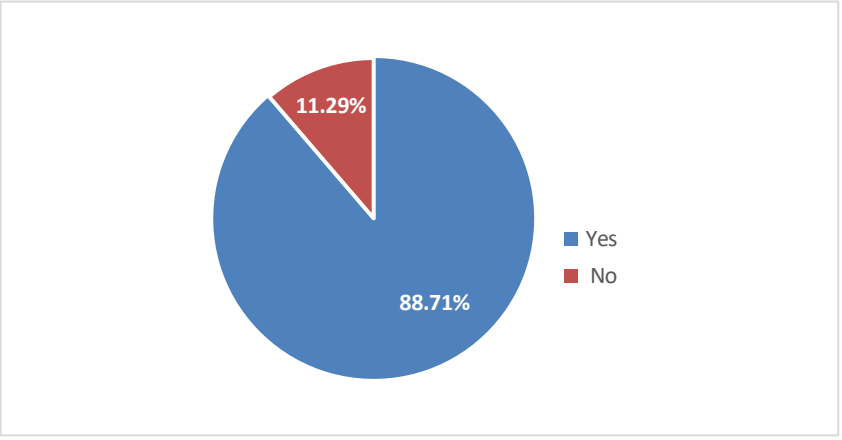

Figure 2.

Something interesting worth noting relates to teachers' opinions regarding the implementation of this curriculum. Today, we see teachers engaged in teaching, taking care of students, correcting, evaluating, completing documents, collecting materials, and preparing lessons. Therefore, we investigate teachers' responses to the question of how many hours per day they dedicate to mathematics teaching activities, both within and outside school settings. This includes tasks such as administrative duties, evaluating student work, and other non-classroom teaching responsibilities. So if we look carefully at the chart below, we notice that about 82% of teachers spend two or more hours on their work, not including the time spent on teaching and daily preparation. (See Figure 3)

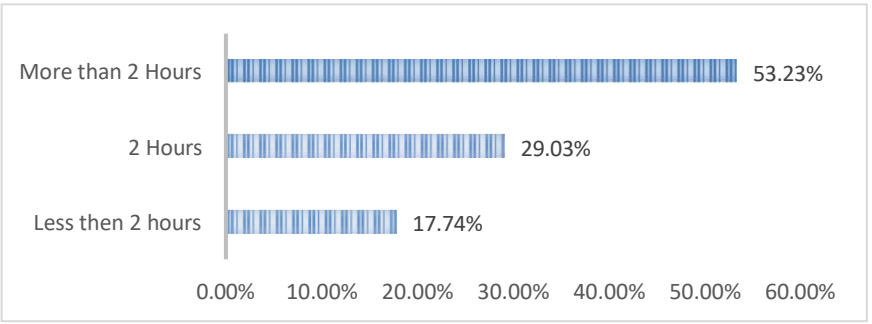

Figure 3

In relation to the questions, "*how effectively do today's mathematics texts address these concepts, and would you advocate for a restructuring of mathematical concepts within each class*?", we see that although 37% of teachers responded that the concepts are well covered in today's textbooks, we noticed that approximately 30% of them agree to a reorganization of these concepts (See Figure 4 and Figure 5).

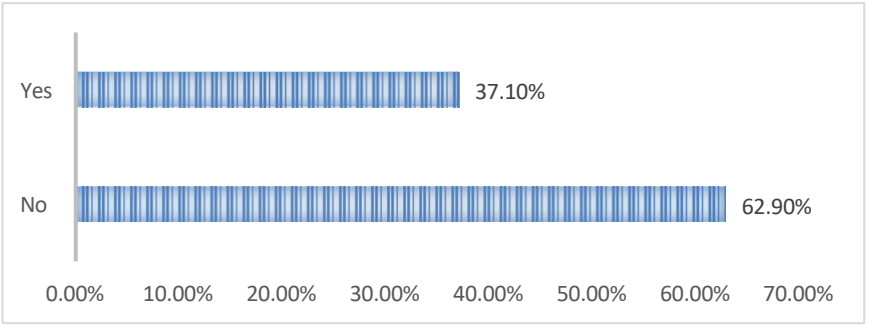

Figure 4

Sixty-three percent of teachers answered that they are not satisfied with the treatment of mathematical concepts in today's textbooks, and ninety-three percent of them agree with restructuring these concepts (See figure 5).

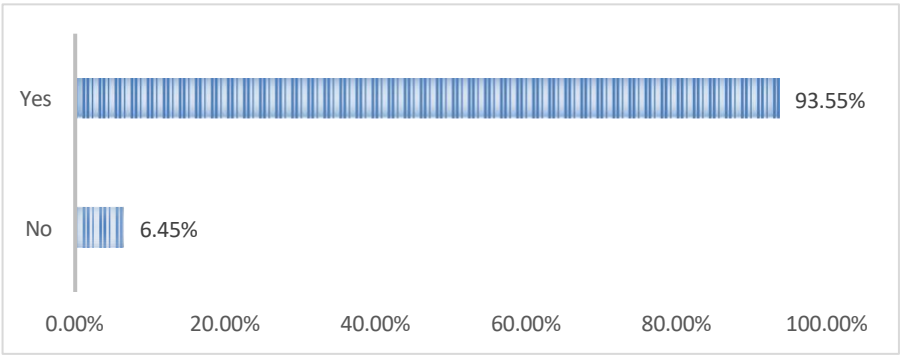

Figure 5

A Chi Square test was performed to study if there is a significant relationship between variables: *To what extent do you agree: The restructuring of mathematics concepts is divided into parts according to the following eight disciplines; Arithmetic, Algebra, Analysis, Plane Geometry, Space Geometry, Trigonometry, Discrete Mathematics, Statistics and Probability* and *Would you like a restructure of math concepts for each class?* Based on the results (χ^2 (4) =12.477, p-value=0.014<0.05) there is a significant relationship between the two variables.

Returning to the question posed in the first section: *How well do you think the concepts are covered in today's mathematics textbooks?* , we focus on one of these concepts: 'Sets'.

In primary education, before beginning with numbers and operations involving natural numbers, concepts are introduced to the students through diagrams in a simplified manner. This approach is predominantly used in first grade and to a lesser extent in second grade, but not beyond. When assessing how well students grasp these concepts from their primary education, their responses have varied. Regarding the question, *'To what extent do you agree that students gain a good understanding of sets during primary education?*' the answers vary and are scaled according to the Likert from scale for agreement, ranging from one (not at all agree) to five (strongly agree) (See Figure 6).

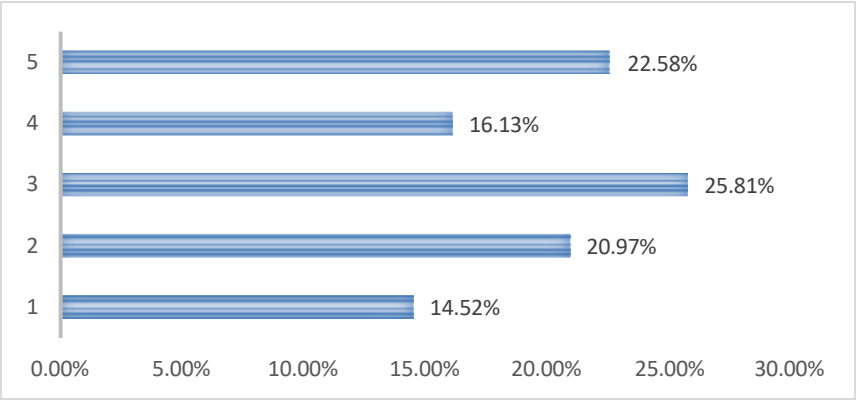

Figure 6

If we carefully examine the data from the graph, it is necessary for a secondary education mathematics teacher to know in advance how much knowledge the students have about the concept they will teach, in our case, 'sets'.

From the study of the mathematics program in secondary education and the current curriculum, as well as from the responses received from teachers regarding when students grasp the concept of sets, we observed that this understanding typically begins to develop in ninth grade and continues into tenth grade. However, from the study, we noticed that 83.9% of the teachers agree that more hours should be allocated to the treatment of this concept. Additionally, 96.8% agree that the treatment of any sets should start earlier, followed by the treatment of numerical sets. Furthermore, those who do not support increasing hours for this concept agree that its treatment should commence earlier. (See Figure 7).

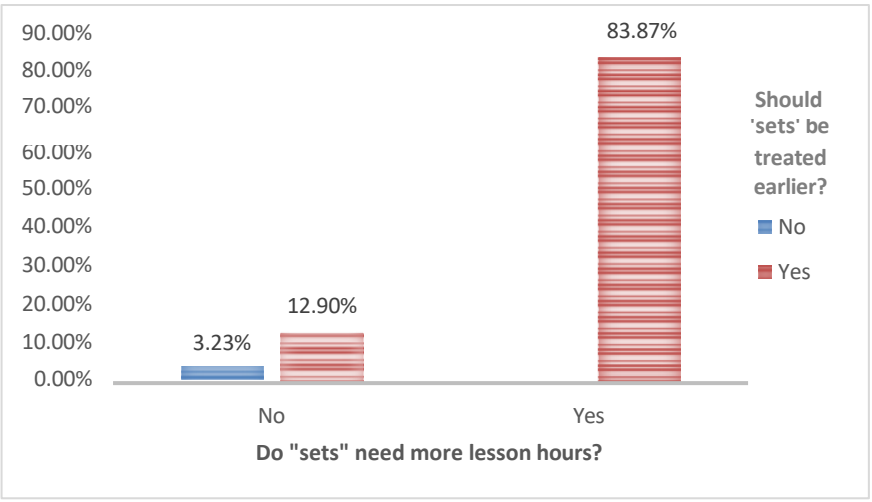

Figure 7

The symbolism of mathematics is crucial for accurately understanding and addressing assigned tasks. Regarding the symbolism used in the concept of sets, only 6.5% of teachers report that students understand it very well. This observation is also reflected in teachers' responses to the question: *Do students find it easier to define sets by enumeration or by description?*

Our findings indicate that 80.6% of respondents find it more convenient to identify sets by enumerating their elements rather than describing them. This preference stems from the need for a profound grasp of mathematical symbols and deeper logical reasoning to articulate set descriptions effectively. (Figure 8).

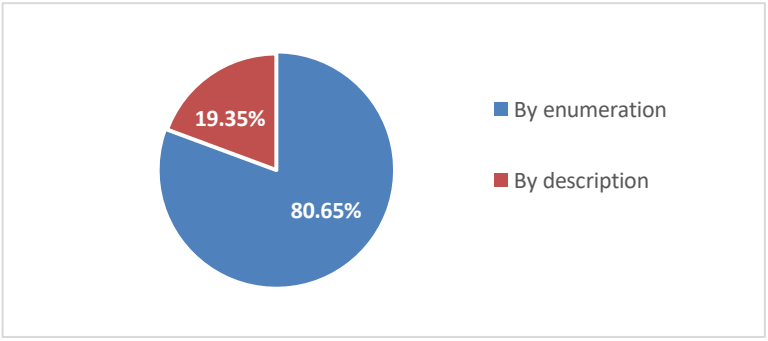

Figure 8

Next we examined students' familiarity with set symbols. Another Chi Square test was performed to study if there is a significant relationship between variables: *How well do they use sets symbols?* and *How well do students know the symbols used on set theory?* Based on the results (χ^2 (16) =88.835, p-value=0<0.05) we conclude that there is a significant relationship between the two variables.
Although the teachers state that the students do not know and use symbols very well in mathematics, they do not agree on the reasons. Some believe that students do not have good results in mathematics because they make mistakes in the use of symbols. (See Figure 9)

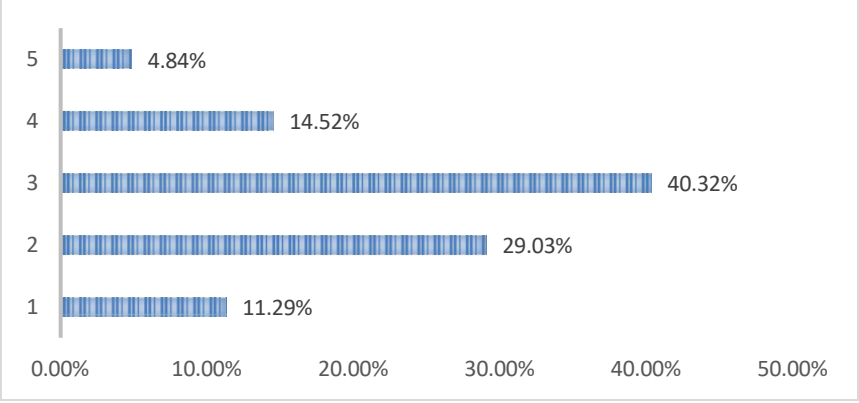

Figure 9

As for whether it is important to teach students the language of symbols in mathematics, 69.4% of teachers completely agree (Figure 10).

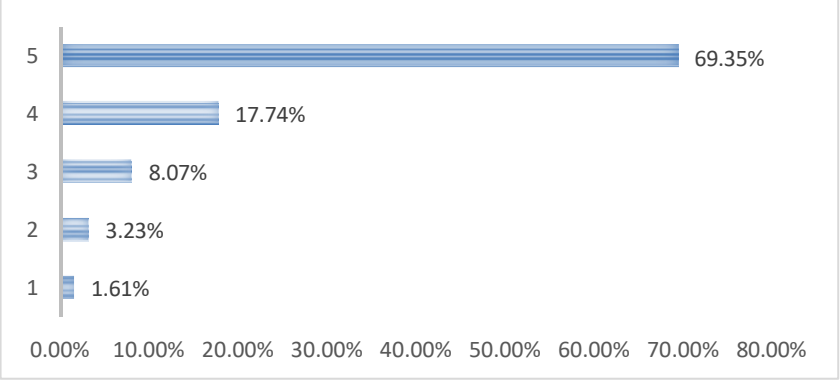

Figure 10

Through the third section of the questionnaire, we aim to obtain data about the use of technology in teaching. According to the answers received, about 53% of teachers use technology in their teaching. Of these, 34% use different platforms in the learning process, mainly in geometry and statistics. But even though a large number of teachers do not use platforms in teaching, we noticed that 92% of them express interest in learning about and using these platforms, and 84% of teachers think this will affect students' motivation in learning mathematics.

The purpose of obtaining data related to the use of technology in this section is to see how, in the future, we will include as many mathematical concepts as possible (including sets, of course) to be explained with the help of different platforms.

Conclusions

The mathematics curriculum in pre-university education varies according to educational levels, from preschool to upper secondary education. It also depends on the national standards adapted to the cultural, economic, and social development of the country where it is implemented. Government policy also has an essential influence. In collaboration with education actors such as teachers, parents, students, and other interested parties, it brings about essential changes. These changes gradually lead to educational reforms. Regarding what we presented in the curriculum we can say that we were influenced by the results obtained from our study

Approximately 53.2% of teachers report spending more than two hours correcting and completing documents. According to their responses, this time would be more valuable if allocated to planning lessons in the most appropriate and effective manner. Additionally, there is a need to include resource materials, contemporary didactic materials, and more models of lessons and tests.

Our study focused on examining the treatment of a fundamental concept in secondary education mathematics, relying on the current mathematics curriculum and textbooks. Specifically, we investigated the concept of sets. We observed that this topic begins to be covered cursorily in ninth grade and is addressed in more detail in tenth grade. Based on this progression of the concept of sets, approximately 83.9%

of teachers agree that more instructional time should be devoted to this concept in secondary education. Furthermore, about 96.8% agree that teaching sets should start earlier to facilitate students' understanding of numerical sets later on.

The symbolism in mathematics is crucial for accurately understanding and correctly responding to what is asked of us. Regarding the symbolism used in the concept of sets, only 6.5% of teachers report that students are very familiar with it. While teachers agree that students generally lack proficiency in understanding and employing mathematical symbols, there exists limited consensus regarding the symbols' influence on students' academic outcomes. This issue merits deeper scrutiny through a rigorous research study.

Based on the data obtained, 69.4% of teachers strongly advocate for a gradual introduction of the language of mathematical symbols to students, tailored to their age.

There is a significant relationship between how *well do the students use sets symbols* and *how well do students know the symbols used on set theory* and between the teachers opinions about: *The restructuring of mathematics concepts is divided into parts according to the following eight disciplines; Arithmetic, Algebra, Analysis, Plane Geometry, Space Geometry, Trigonometry, Discrete Mathematics, Statistics and Probability* And *Would you like a restructure of math concepts for each class?*

Building upon the previously outlined discussion, it is crucial to emphasize the foundational concepts of set theory at the commencement of sixth grade. These concepts include defining sets and subsets, introducing operations like union and intersection, understanding the completeness and distinctions within sets, and exploring the Cartesian product of two sets. At this stage, students should familiarize themselves with mathematical symbols corresponding to each operation. This early exposure allows them to establish foundational skills in mathematical logic and abstraction.

Regarding the data collected from the third section of the questionnaire, it is noteworthy that 84% of teachers believe that incorporating platforms into the learning process will impact students' motivation to learn mathematics. This finding underscores the potential to utilize such data in elucidating and understanding the concepts related to sets

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USING BI-FACTOR EXPLORATORY STRUCTURAL EQUATION MODELING TO ASSESS HIGH SCHOOL STUDENTS' INFORMATION SOURCES FOR CHOOSING THEIR ACADEMIC CAREER

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Abstract
The information that high school students gather regarding the future academic direction plays an important influencing role in their decision-making. This study aims at creating a measurement instrument for assessing the degree of importance that different sources of information play in this process. Based on the data of 859 high school students, the measurement instrument resulted with good psychometric characteristics, in terms of reliability and validity. It showed configural and metric measurement invariance across gender. The 16 items, which formed the measurement scale, were better represented by a five-dimensional Bi-factor Exploratory Structural Equation Modeling, among the five competing models

Keywords: *measurement scale, psychometric characteristics, bi-factor exploratory structural equation modeling, academic career, information sources*

Introduction

Often, in our daily life and work, we face phenomena which are complex in nature and at the same time do not present physical dimensions. Such phenomena appear in various fields, such as those of psychology, psychiatry, political science, ecology, management, social sciences, education, etc. The fact that these phenomena are abstract in conception, or in a latent state, makes it extremely difficult to measure them with satisfactory accuracy. They cannot be directly observed, measured and explained, but can only be inferred through multivariate statistical approaches with latent variables from other observable variables that can be directly observed or measured (Dodge, 2003).

Such observed variables could often be the items of a questionnaire, which could be quantified and then relationships between them and latent variables could be established. In this context, the use of latent variables can serve to reduce the dimensionality of data. More concretely, a set of observed variables (indicators) can be aggregated in a model to represent an underlying concept, making it easier to understand the data. The Structural Equation Models (SEMs) have a central position in the models with latent variables, because they enable the modeling of complex relationships between continuous variables at the latent level, corrected by measurement errors. Usually, the latent variable measurement specification in SEM (Bollen, 1989) uses the Jöreskog (1969) Confirmatory Factor Analysis (CFA) model, but sometimes, in addition to these models, measurement models that are less restrictive can be used, which give access to all SEM parameters. Such are for example Exploratory Structural Equation Modeling (ESEM). In some circumstances, the most accurate explanation of the complex nature of phenomena may require more complex models, which contain a general construct that measures the quantitative part of the phenomenon, but at the same time can also measure sub-constructs that can affect the phenomenon qualitatively. Bi-factor models can be a good solution, in this context.

Methodological Issues:

CFA, for many decades, has played an important role to test the factorial structure in the measurement of latent phenomena. Integrated within the SEM framework, CFA, which is theory-driven, tests the fit of data with a priori expectations, assessing relationships between constructs at latent level, corrected for measurement errors. In CFA, the number of factors (latent variables) underlying a set of indicators and the pattern of associations between indicators and factors is pre-specified, and the corresponding model is estimated using maximum likelihood or other techniques. When an indicator is declared to be directly linearly related to a factor, it is said to "load" on that factor. In this model, covariance between indicators loading on the same factor is explained by the loadings on the factor, whereas covariance between indicators loading on different factors additionally involves the correlations between factors. CFA is based on Independent Cluster Model (ICM), where cross-loadings between items and non-target

factors are constrained to be zero. These restrictions on the measurement model, based on a priori knowledge, make CFA more parsimonious, where latent variables are easier to understand and interpret (Xiao et al., 2019), but on the other hand, it often leads to a poor fit of the model to the data. This forces a researcher to make more model modifications to improve the model. As a consequence, this procedure becomes more exploratory than confirmatory. Also, considering the complex nature of the data, it does not seem very realistic for a set of indicators to be perfectly and uniquely related to only one latent construct (Morin et al., 2016), because most items on psychological or other behavioral measures tend to measure more than one conceptually related factor (Mai et al., 2018). Consequently, even small cross-loading items on non-target factors should be taken into consideration (Xiao et al., 2019). Furthermore, cross-loading constraints to zero, artificially inflates the associations of items with factors (Cao & Liang, 2021), leading to over-estimated factor correlations and subsequent distorted factorial structure. On the other hand, Exploratory Factor Analysis (EFA) measurement models are data-driven models, which are not based on a priori assumptions regarding the factorial structure, but rather have an exploratory nature. In EFA all cross-loadings are freely estimated, to achieve a simple and interpretable factorial solution and then, from several comparative models, the one that best fits the data, based on the values of several criteria, can be used for further analysis. The fact that EFA is data-driven, so it does not have an a priori structure, does not allow it to be used in more complex analyses, or for testing scale measurement invariance. In multi-factor behavioral instruments, traditional CFA goodness-of-fit indices do not seem to perform satisfactorily. Other innovative and robust approaches should be used to address the assessment of the psychometric properties of these instruments. An interesting and promising alternative to overcome the limitations of ICF-CFA is Exploratory Structural Equation Modeling (ESEM). ESEM (Asparouhov & Muthén, 2009, Marsh et al., 2014), combines CFA, EFA and SEM, in a single model, best incorporating several advantages of CFA and EFA. It provides a compromise between the mechanical iterative approach toward finding optimal factorial solutions through rotations within an EFA and the restrictive a priori theory-driven modeling approach employed within CFA measurement

models (Morin et al., 2020). Marsh et al. (2014) stated that ESEM is fundamentally a confirmatory technique (although it can be used in an exploratory way), which through a target rotation, makes it possible to model data in a confirmatory way by allowing for the presence of cross-loadings between items. Although permitted, cross-loadings (non-target loadings) are constrained to be as close to zero as possible (Asparouhov & Muthén, 2009). Rotation procedures are required for model identification but, are employed to simplify the interpretability of the factors which ESEM/EFAs tend to estimate. The choice of rotation procedure directly affects the estimated factor correlations and cross-loadings (Morin, 2021). ESEM models allow the researcher to use substantive information and, by using different rotation criteria, to achieve the factor structure that best suits his purpose, without compromising the fit of the model. Xiao et al. (2019) indicated that the three most popular rotation methods employed in ESEM are the (oblique) GEOMIN and TARGET rotations, with ORTHOGONAL rotations being used for bifactor ESEM models. Asparouhov and Muthén (2009) stated that GEOMIN rotations, where correlations between factors are estimated and incorporated, generally perform well if the estimated model isn't too complex. For the estimation of more complex models, TARGET rotation should be preferred. TARGET rotation (in which all cross-loadings are freely estimated but "targeted" to be as close to zero as possible) makes it possible to use a fully confirmatory approach to the specification of EFA/ESEM factors (Asparouhov & Muthén, 2009; Browne, 2001). Simulation studies have shown that small cross-loadings use all the relevant information present at the item level, for latent construct estimation, reducing the inflated or biased parameter estimates (Marsh et al., 2014). ESEM usually fits the data significantly better than traditional CFA and EFA models. According to Morin et al. (2020) and Marsh et al. (2014), in ESEM latent factor correlations are less biased and are closer to the true associations and most importantly, these models are usually also more in line with the theoretical conceptualization and considerations of the construct the instruments intend to measure. However, when the phenomena taken in the study or the nature of a latent construct of a measurement scale is multi-dimensional, the use of the bifactor model may be required. In a bifactor CFA model (Holzinger & Swineford, 1937), all indicators load directly onto a general factor that reflects their

common variance, and sub-sets of indicators, with highly similar content, are additionally allowed to load onto orthogonal specific factors. The general factor of a bifactor CFA model is frequently the only latent variable of interest, while the specific factors are considered as residual, nuisance factors (DeMars, 2013; Reise, 2012; Rodriguez et al., 2016). The correlations between the general factor and sub-factors as well as those between the sub-factors with each other are all constrained to be zero. This orthogonality condition between factors partitions the total covariance among the items into a general construct underlying all items, and the sub-constructs explaining the residual covariance not explained by the general factor. In general, bifactor models perform better than competing models (Rodriguez et al., 2015, Reise, Bonifay, & Haviland, 2013). Also, in addition to the hierarchical nature of the latent constructs that are estimated, the fact that the indicators of the measurement scale tend to have association as small as possible with non-target constructs requires the use of Bifactor Exploratory Structural Equation Modeling (B-ESEM, Reise, 2012). B-ESEM method offers the most detailed and flexible models possible, more so than either EFA or CFA/SEM alone and, can now be implemented, while relying on a confirmatory bifactor target rotation approach (Morin et al., 2016).

Method

Participants and Procedure

The data used for analysis in this paper were part of the data of a wider questionnaire, which was carried out during the month of April 2022 in the region of Korça, located in the south-eastern part of Albania. Data collection was made possible in cooperation with the Regional Education Directorate and some responsible persons of the schools participating in the study. Questionnaires were distributed online through the Google Forms platform and addressed the students of 14 high schools in the region. 859 individuals successfully completed the questionnaire. The majority of participants came from general secondary schools. 57.3% of the total individuals who completed the questionnaire came from urban areas. 65.3% of the students were female. The distribution of high school students among the three classes was almost proportional.

Measures

Part of the questions, on which this paper was based, were of a socio-demographic nature, while the main part of them was related to the importance of the sources of information that high school students use in order to make decisions about their future academic career. After an extensive research in the literature of the last two to three decades, it turned out that the main sources influencing the decision-making of high school students were: parents or other family members; counselors, career advisers or teachers in secondary schools; friends, peers and relatives; former/current university students; open days and campus visits; university websites; social networks; media (TV, Radio) etc. The measurement instrument, designed to measure the degree of importance that different sources of information play in the decision-making of secondary school students about their future study profile, was based on these sources of information, as well as on a measurement scale (Areces et al., 2016) , which had resulted in good psychometric characteristics. After some small modifications of this instrument, taking into consideration some specifics of our region, it was concluded in a measurement scale with 16 items. Two experts in the field were engaged in translating and adapting the questionnaire from the English language version. The questionnaire was pre-tested with a small experimental group of high school students. The responses to the questionnaire items were on a five-category Likert scale, ranging from 1 ("not at all important") to 5 ("very important"). The items were related to the importance of the information that students received from: influential persons in secondary schools (3 items); their family members (3 items); people in their closest environment, such as friends or relatives (3 items); promotional activities of the university, such as open days, workshops, sports activities (3 items) and university activities promoted on various online platforms, such as university websites, social media, etc. (4 items).

Data Analysis

The arrangement and processing of the data collected from the questionnaires was done in the SPSS software package, while their analysis through various statistical models was done in Mplus, Version 8.10 (Muthén & Muthén, 1998-2017). The data of the measurement

scale were categorical, of ordinal scale and as such were specified in Mplus syntax, through the use of the Categorical Variable Methodology (CVM). In order to find the most appropriate factor structure for the 16 items measurement scale, four competing models were tested and compared: The five- dimensional CFA model, Bifactor-CFA model, ESEM and B-ESEM. Several traditional fit statistics were used to select the best model, among the four comparative models: Chi-Square/d.f. (< 5), the Comparative Fit Index (CFI ≥ 0.95), the Tucker Lewis Index (TLI ≥ 0.95), the Root Mean Square Error of Approximation (RMSEA ≤ 0.06) and the Standardized Root Mean Square Residual (SRMR ≤ 0.08) (Hu & Bentler, 1999). For the estimation of the parameters of the competing models, the WLSMV estimator was used, which is recommended when the data are ordinal, to address non-normality problems (Finney & DiStefano, 2013). For handling the missing data, the missing completely at random (MCAR) mechanism (Little, 1988) was used. Rotation method used in ESEM was TARGET with OBLQUE type of rotation, while TARGET with ORTHOGONAL type of rotation was used for B-ESEM.

Results

Table 1 provides fit statistics for each of the competing estimated models. The fit statistic values show that the five-dimensional CFA model (M1) has a good fit to the data. The only exception is the RMSEA indicator, whose value indicates an acceptable fit (< 0.8). This model, which constitutes the basis of the five-dimensional factorial structure of the measurement instrument, results in good psychometric characteristics, related to composite reliability and convergent validity. Composite reliability (CR) coefficients for all five factors had values greater than 0.7. Average Variance Extracted (AVE) values for all five factors were greater than 0.5.

Table 1. *Goodness-of-fit statistics for five competing models*

Models	χ^2	df	RMSEA 95% C.I.	CFI	TLI	SRMR
M1 Five-dimensional CFA	532.746	94	.074 (.068 - .080)	.990	.988	.020
M2 Five-dimensional ESEM	180.350	50	.055 (.047 - .064)	.997	.993	.007

M3 Bifactor CFA	1082.536	88	.115 (.109 - .121)	.978	.970	.038
M4 Bifactor ESEM	60.180	39	.025 (.011 - .037)	1.000	.999	.004

Note: χ^2 = Chi-square; df = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; SRMR = Standardized Root Mean Square Residual

Regarding discriminant validity, it shows some problems with factors 3, 4 and 5 (Table 2). The square root value of AVE in some cases resulted to be smaller than the correlation between some factors of the model.

Table 2. *Results for Composite Reliability and Construct Validity in the Five-Dimensional CFA*

F1		F2		F3		F4		F5	
Items	λ	Items	λ	Items	λ	Items	λ	Items	λ
v1	0.871	v4	0.968	v7	0.781	v10	0.882	v13	0.873
v2	0.927	v5	0.975	v8	0.857	v11	0.922	v14	0.938
v3	0.929	v6	0.496	v9	0.843	v12	0.883	v15	0.766
								v16	0.896
AVE	0.827		0.711		0.685		0.803		0.758
CR	0.935		0.873		0.867		0.924		0.926

	F1	F2	F3	F4	F5	
F1	0.909 *					
F2	0.665	0.843 *				CR > 0.7 AVE > 0.5
F3	0.750	0.736	0.828 *			sqrt AVE > Factor correlations
F4	0.787	0.574	0.842	0.896 *		
F5	0.734	0.546	0.804	0.938	0.871 *	

Note: λ – item loadings; AVE – Average Variance Extracted; CR – Composite Reliability; *-square root of AVE

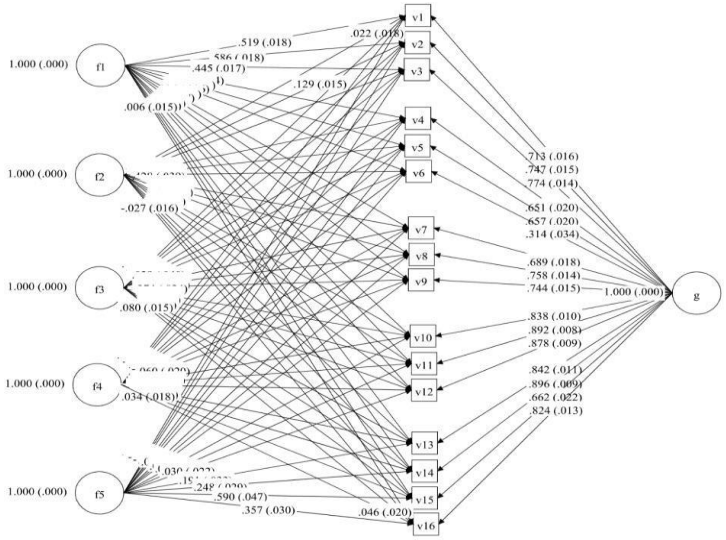
The ESEM model (M2) showed even better fit to the data, compared to the CFA model, and this was reflected in the values of all fit indices. Even, the values of the correlation coefficients between the five factors in the ESEM model were significantly smaller than those of the CFA model. B-ESEM (M4) was the best performing model, compared to other competing models, showing an almost perfect fit to the data. For the data of the 16 items measurement scale, B-ESEM reflects a general factor, for the quantitative measurement of the degree of importance that overall information sources have on pre-university students decision-making and, at the same time, it reflects the importance that five specific sub-constructs of information sources, which express common features of sub-sets of scale items, have in students' decision-making (qualitatively), unexplained by the general factor. Cross-loadings are permitted to be free, but targeted to be as close to zero as possible, providing the model with additional information (Table 3).

Table 3. *Standardized loadings and cross-loadings for B-ESEM*

Items	G-Factor	F1	F2	F3	F4	F5
V1	0.713	**0.519**	0.022	-0.056	0.033	-0.006
V2	0.747	**0.586**	0.129	-0.011	-0.016	-0.008
V3	0.774	**0.445**	0.083	0.078	0.009	-0.022
V4	0.651	0.093	**0.672**	0.088	-0.028	-0.052
V5	0.657	0.062	**0.741**	0.086	-0.042	-0.044
V6	0.314	0.036	**0.428**	0.029	0.016	-0.007
V7	0.689	-0.007	0.128	**0.435**	-0.034	-0.016
V8	0.758	0.064	0.091	**0.322**	-0.002	0.002
V9	0.744	-0.049	0.136	**0.374**	0.060	0.018
V10	0.838	0.033	-0.045	0.086	**0.270**	0.048
V11	0.892	0.024	-0.081	-0.034	**0.303**	0.024
V12	0.878	-0.079	-0.116	-0.105	**0.053**	0.030
V13	0.842	-0.085	-0.094	-0.087	-0.039	**0.191**
V14	0.896	-0.048	-0.119	-0.104	-0.029	**0.248**
V15	0.662	0.014	-0.022	0.024	0.034	**0.590**
V16	0.824	0.006	-0.027	0.080	0.046	**0.357**

The diagram of the B-ESEM model is presented in Figure 1.

Figure 1. *B-ESEM diagram of 16 items scale instrument.*



B-ESEM resulted to have configural and metric invariance across the gender (Table 4).

Table 4. *Invariance Testing of Bi-factor ESEM (output in Mplus)*

Model	np	Chi-Square	Df	p - value
Configural	204	117.303	100	0.1139
Metric	149	191.629	155	0.0242
Scalar	133	235.527	171	0.0008
Models Compared				
Metric against Configural		73.238	55	0.0506
Scalar against Configural		115.915	71	0.0006
Scalar against Metric		49.611	16	0.0000

Note: np - number of parameters; df – degrees of freedom

Discussions and Conclusions

The paper provided a measurement instrument with good psychometric properties. The CFA model appeared to have good characteristics in terms of composite reliability and convergent validity. Some minor

problems were noted regarding the discriminant validity of some factors. This can be more related to the Independent Cluster Model (ICM) constraints inherent in CFA (Marsh et al., 2009; Cao & Liang, 2021), which often lead to inflated correlation values between latent factors. Freeing the cross-loadings in ESEM, taking into consideration the fallible nature of items as perfect items of a single construct, we received valuable information, which led to the improvement of the model. The estimated factor correlations decreased significantly, becoming less biased and closer to the true values. B-ESEM took into consideration not only the fallible nature of the scale items, but also the hierarchical nature of the phenomenon under study. The use of information in the most complete way made the B-ESEM model to have an excellent fit with the data obtained from 16 scale items. It also had configural and metric invariance across gender, showing that the same items measure our construct across gender and that the construct has the same meaning to female and male participants. The condition of orthogonality of all the factors of the model enables the calculation of some model-based indices, which help in the better understanding of the hierarchical nature of the phenomenon, simultaneously improving the more detailed testing of the psychometric characteristics of the measurement instrument. However, this was not the subject of this paper. The values of the item loadings on the general factor showed that students gave more importance to the sources of information obtained from the university promotion, physically or online, through the university website or social networks. The findings of this paper can help the institution to direct more effectively its promotional strategy regarding the prospective students. This measurement instrument can be used in the future by other researchers interested in measuring this phenomenon.

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GRAPHICAL PRESENTATION OF DATA USING R

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Abstract
Graphical presentation of data is part of understanding and comparing data. At the beginning of this paper, we will present the basic functions used for data visualization. We will show how to create simple graphs from data, e.g. histograms, bar graphs or pie charts. Graphs can also be used to visualize mathematical functions. Then we will present "Data Visualization" using the "ggplot2" package, which is a more advanced technique. When deciding on a visualization approach, it's also important to keep our goal in mind. Our goal should guide what kind of visualization we can create. Our goals can be different, for example comparing data from two groups or describing the relationship between two variables. Regardless of our purpose, data visualization must be true, intuitive, understandable and aesthetically pleasing. The "ggplot2" package is designed to give graphs a more consistent and aesthetically pleasing look. We will show many different types of visualization e.g. scatter plots, histograms, box plot and under which circumstances they should be used.

Keywords: *Graph, "ggplot2" package, histogram, box plot, scripts.*

Introduction

In the 21st century, the development of technology has had a great leap. The ongoing revolution in computing automates the details of performing calculations and making graphs. This has led to statistical concepts and knowledge from data becoming even more practical for students, teachers and researchers. Statistics is the science of data. In the world of big data, data visualization tools and technologies are

essential for analyzing massive amounts of information and making data-driven decisions. Our culture is visual, including everything from art and advertisements to TV, and our eyes are drawn to colors and patterns. Data visualization is a form of visual art that grabs your interest and keeps our eyes on the message.

Data visualization is the process of presenting complex information in a visual format that is easy to understand and interpret. It helps us identify patterns, trends and outliers in their data, enabling us to make more informed decisions. Visualization helps us to understand the trend of data in a massive table, linear or non-linear relationships between two variables, comparison of several data sets, to create an initial idea of data distribution and using graphs, charts and elements other visuals, we can transform raw data into meaningful insights.

Graphical methods play an important role in regression analysis. [1] Chambers (1993) says, “There is no single statistical tool that is as powerful as a well-chosen graph”, while [2] Huber (1991, p. 121) says, "Eye-bawling can give diagnostic insights no formal diagnostics will ever provide".

1. About R And Installation

R is a powerful language and environment for statistical computing and graphics. The main advantages of R are the fact that R is freeware and that there is a lot of help available online. I prefer to use the RStudio interface, which has an organized layout and some additional options.

1.1 Installation and RStudio layout

The website address from where the R program can be installed is: *http//www.r-project.org/*. After installing R, we install the RSudio interface from the address: *http//www.rstudio.org*.

The RStudio consists of several windows: **script window** (Top left, Collections of commands can be edited and saved), **command window** (bottom left, where commands are executed), **workspace window** (top right, here we can see what data and values R has in its memory). Bottom right: **files/plots/packages/help window**. Here you can open files, view plots (also previous plots), install and load packages or use the help function [3] (Torfs, P., Brauer, C., 2014).

1.2 Installed packages and installing new packages

Some packages are pre-installed in the program. To see which packages are installed, go to the packages window or type **library ()** in the command window. There are many more packages available on the R website. If we want to install and use a new package, then we have to click on the package window and write the name of the package. If we have previously installed a package, then type the **library (name of the package)** in the command window. The packages we need for our work are:

```
library(car)            ## Companion for applied regression
library(questionr)      ## Helpful functions for survey research
library(effectsize)     ## Indexes of effect Sizes and
standardized parameters
library(lattice)        ## Graphics system
library(ggplot2)        ## Graphics system
library(dplyr)          ## Comprehensive package for data
science (from car)
library(knitr)          ## An engine for dynamic report
generation with R (was built)
library(psych)          ## A general purpose toolbox for
research (was built)
library(psychTools)     ##Tools to accompany the 'psych'
Package (was built)
library(gplots)         ## Various R Programming tools for
plotting data (under R)
library(vcd)            ## Tools for visualizing categorical data
(under R)
library(aplpack)        ## Data plotting package
library(gridExtra)      ## Miscellaneous (was built under R
version 4.3.2)
library(ltm)            ## For the Cronbach coefficient
```

2. Functions for Graphs

RStudio offers a wide range of charting features that allow you to present your data in various formats such as bar graphs, pie charts, and more. You can easily modify colors, fonts, labels, and other elements to ensure your visualizations align with your brand identity or presentation style. Additionally, you can add titles and axis labels to provide context and clarity to your audience.

2.1 Graphics functions in R

The following is a list of the most practical graphics functions in R:

- **plot**: generic function for plotting of R objects
- **barplot**: creates a bar plot with vertical or horizontal bars
- **boxplot**: produce box-and-whisker plot(s) of the given (grouped) values
- **lines**: a generic function taking coordinates and joining the corresponding points with line segments
- **ablines**: draw line (segment). Arguments: **a,b** for intercept **a** and slope **b**; or **h=y** for horizontal line at **y**; or **v=x** for vertical line at **x**
- **points**: A generic function to draw a sequence of points at the specified coordinates
- **curve:** add function to plot. Needs to have an x in the expression
- **legend**: add legend with given symbols (lty or pch and col) and text (legend) at location (x="topright")
- **pairs**: Produce a matrix of scatter plots
- **hist**: Computes a histogram of the given data values
- **acf**: Computes (and by default plots) estimates of the autocorrelation function
- **dotchart**: Draw a Cleveland dot plot
- **pie**: Draw a pie chart
- **polygon**: Polygon draws the polygons whose vertices are given in x and y
- **symbols**: This function draws symbols on a plot
- **arrows**: Add arrows to a plot
- **axis**: Add an axis to a plot
- **stars**: Draw star (segment) plots and spider (radar) plots
- **contour**: Create a contour plot, or add contour lines to an existing plot
- **image**: Creates a grid of colored or gray-scale rectangles with colors corresponding to the values in z.

There are several graphical parameters that can be specified in the graphics functions or through parameter function, par(), before the graphs. Most important graphical parameters:

- **main**: plot main title

- **lty**: line type – 1=solid, 2=dashed, etc.
- **lwd**: lines width
- **col**: color – "blue", "red", etc
- **ann**: plots annotations which is axis titles and overall titles, ann = FALSE means no titles
- **bg**: background color
- **bty**: border type, **bty = "n"** means border type is NULL
- **cex**: a value giving the amount which plotting text and symbols should be magnified relative to the default
- **xlab and ylab:** axis labels – character string
- **xlim and ylim:** range of axes
- **mfrow**: multiple figures in rows, it is a vector of the form **c(nr,nc)**
- **grid**: add grid

3. Some Applications of these Functions and Parameters

3.1 Bar Charts

A bar chart uses rectangular bars to visualize data. Bar charts can be displayed horizontally or
vertical. The height or length of the bars are proportional to the values they represent.

```
Parties17<- c("A","B", "C","D")        ##The names of the parties in 2017
Data1<- data.frame(
  Percentage = c(18,10, 30,42),
  Parti = factor(Parties17, levels = Parties17)
 )
Colors1<-c("tomato3","red","blue","pink")        ## Determination of colors
## ---The graph using the ggplot command---##
Gr1<- ggplot(Data1) +
  geom_col(aes(Percentage, Parti), fill = factor(Colors1), width = 0.7)
 Gr1 # Display the graph in the corresponding window
```

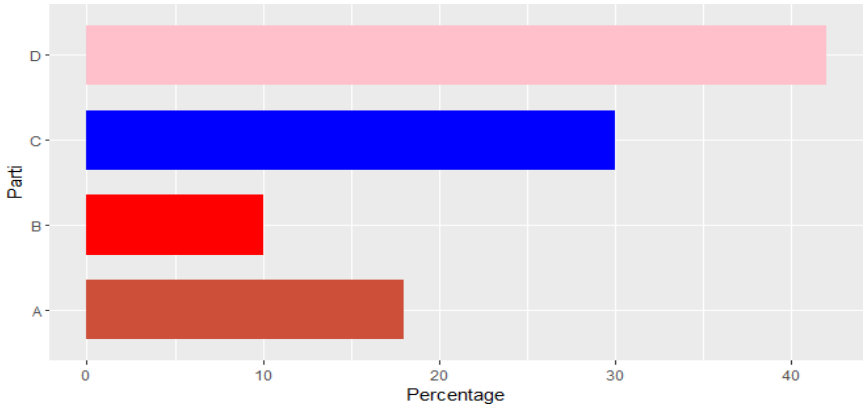

***Figure 1**: Horizontal bar plot for party data*

```
## ----Improved graph construction by adding other parameters---##
Gr2 <- Gr1 +
  scale_x_continuous(
    limits = c(0, 45),
    breaks = seq(0, 45, by = 2),
    expand = c(0, 0), ## The horizontal axis does not extend to either
side
    position = "top"  ## Labels are located on the top
  )
```

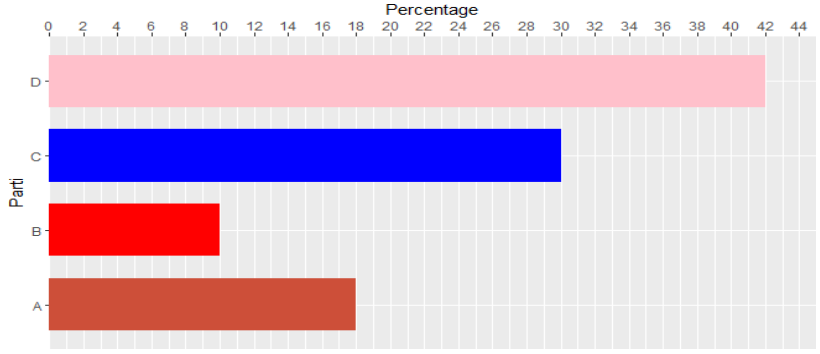

***Figure 2:** Bar plot with additional parameters*

3.2 Vertical barplot

```
## Using the barplot command
par(mfrow = c(1,2)) ##
Gr3<-barplot(Percentage~Parti, data=Data1,
```

```
        col=c("tomato3","red","blue","pink"),
        xlab='Parties',ylab ='Votat(%)',lwd=2,
        panel.first = grid(NA,50, lty = 1, lwd = 2),
        main = "Barplot for votes in 2017")
## Barplot representation of the difference
results2017<- c(18,10, 30,42)
results2021<-c(15,8,34,43)
difference<-results2021-results2017
Gr4<-barplot(difference, col=c("tomato3","red","blue","pink"),
        main="The percentage difference in 2021")
text(x=c(1,2,3,4), y=c(-0.5,-0.5,1,0.5),
    labels = c("-3","-1","+4","+1"), cex=1)
text(x=c(1,2,3,4), y=c(0.5,0.5,-1,-1),
    labels = c("A","B","C","D"), cex=1)
```

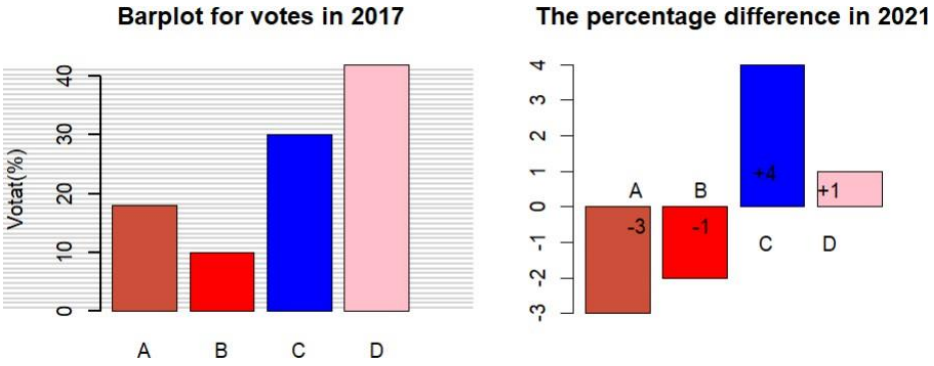

***Figure 3**: Vertical Bar plot.*

3.3 Pie Charts in RStudio

```
rm(list = ls())        ## removes the previous data
Re <- read.csv(file.choose(), header=TRUE)## entering data into R from my data (C:\Users\Perdorues\Desktop\Dosja 2023-2024\Raem 2024)
head(Rd,6)          ## lists the first 6 rows of test score data
```

	Gjinia	Mat	Let	Tp	Ts	To	Ba	Ra	Ka
1	f	10	8	30	41	71	Ru	5	3
2	f	9	7	21	28	49	Qy	3	2
3	m	8	6	19	34	53	Qy	2	4
4	m	7	7	27	34	61	Ru	4	5
5	m	8	5	21	38	59	Qy	4	3
6	f	8	8	26	40	66	Qy	5	2

```
q1<-summary.factor(Rd$Gjinia)
q1 ##
     f      m
    22     18
names(q1) <- c("female", "man")
par(mfrow = c(1,2))
Gr5<-pie(q1, col=c("red","blue"))
fq1.pct <- prop.table(q1)*100  ## Calculates the percentage of
categories
fq1.pct    ## Show category percentages
    female    man
       55     45
## Adding parameters
Gr6<-pie(q1, col=c("red","blue"), main="The pie chart")
text(0, 0.5, "55%", col = "1")
text(0.3, -0.5, "45%", col = "1")
```

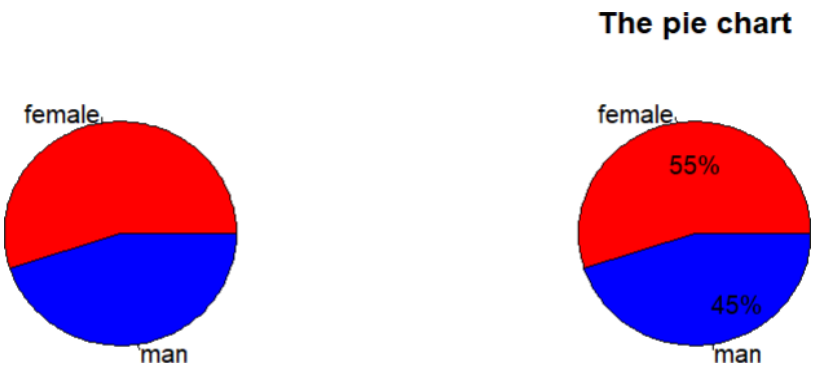

***Figure 4**: To the left is the pie chart without parameters. To the right is the pie chart with parameters.*

3.4 Boxplot

This section shows how to plot a boxplot using the ggplot command and the boxplot command.

```
## Using the ggplot command:
Gr7<-ggplot(Re, aes(x=as.factor(Gjinia), y=Mat)) +
  geom_boxplot(fill="slateblue", alpha=0.2) +
  xlab("Gjinia")
Gr7 ## Display the chart
```

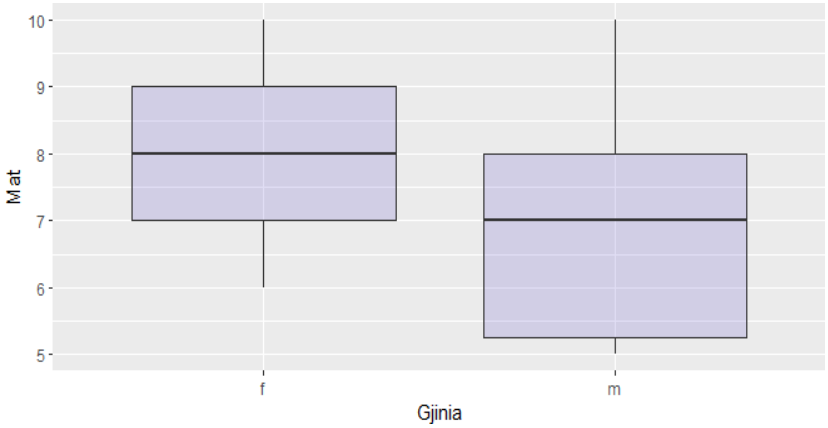

Figure 5: *Boxplot when we use the ggplot command.*

Using the boxplot command:
Gr8<-boxplot(Re$Mat~Re$Gjinia,data=Rd, col = "lightgray")
Comparison of boxplots according to the importance of education and results in mathematics
Gr9<-boxplot(Re$Mat~Re$Ra,data=Rd, col = c("3","4","5","6","7"))

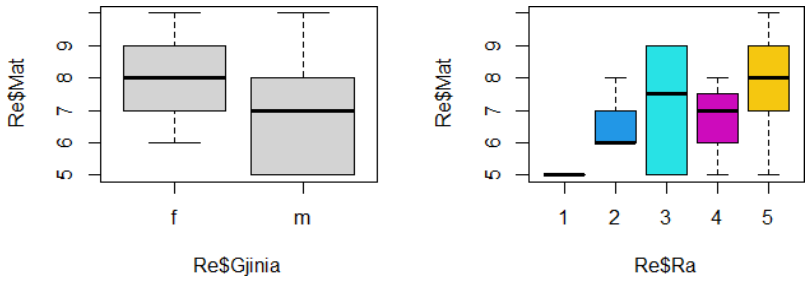

Figure 6: *Boxplot when we use the boxplot command.*

3.5. Histogram and Q-Q plot

Histogram for general test score data and a sample from the exponential distribution
Gr10<-hist(Rd$Tp, col ="lightgray", probability = TRUE,

```
        main = "Histogram for Tp", xlab = "Points",
ylab="Frequency")
```

Normality check

Method 1: Using the histogram

```
Sek = seq(0, 40, length.out = 100)
fn = dnorm(Sek, mean(Rd$Tp), sd(Rd$Tp))
lines(Sek, fn, col = "red", lty = 1, lwd = 2)
## The case when we don't have normality
Eks<-rexp(200, rate=3)
Gr11<- hist(Eks, col='steelblue', main='Not normal')
```

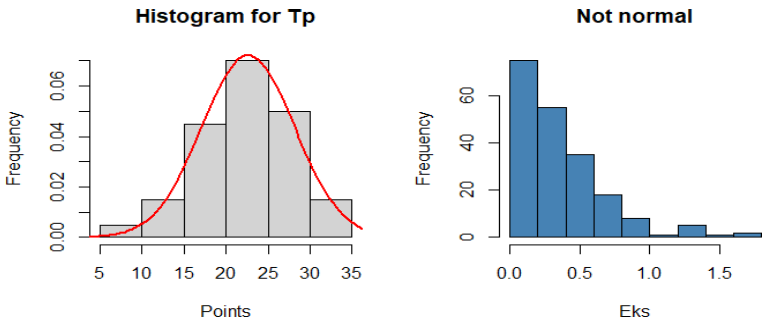

Figure 7: *Left: Normal distribution. Right: Exponential distribution.*

Method 2: Using the Q-Q plot

A Q-Q plot (possibly) with rugs and pointwise approximate (via the Central Limit Theorem) two-sided 1-α confidence intervals.

```
qqnorm(Rd$Tp, main='Normal')
qqline(Rd$Tp,  col="red",lwd=3)
qqnorm(Eks, main='Not normal')
qqline(Eks, col="red", lwd=3)
```

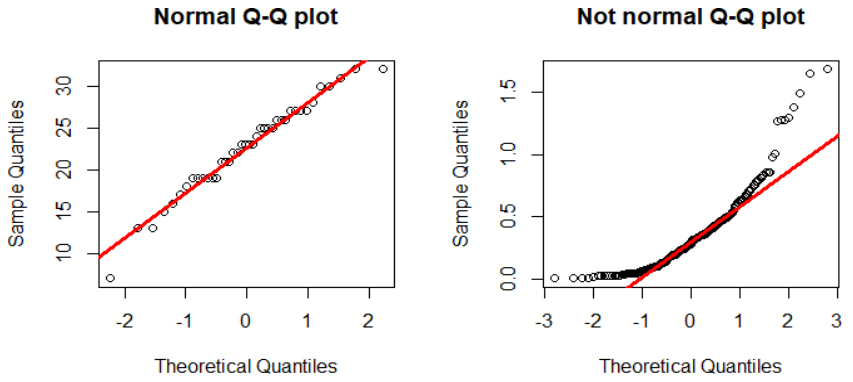

Figure 8: *Left: Q-Q plot for the general test. Right: Q-Q plot shows that we do not have normality.*

Method 3: The Shapiro-Wilk test ([4] Shapiro, S. S.; Wilk, M. B., 1965), ([5] Royston P., 1982).
shapiro.test(Rd$Tp) ## data: Rd$Tp
W = 0.97199, p-value = 0.4152 ## Accepted, because p-value = 0.4152>0.05.
shapiro.test(Eks) ## data: Eks
W = 0.85158, p-value = 5.137e-13 ## Rejected, because p-value = 5.137e-13<0.05.
Method 4: The Kolmogorov-Smirnov Test ([6] Kolmogorov A ,1933, [7] Smirnov N.,1948)
ks.test(Eks, 'pnorm') ## data: Eks
D = 0.50061, p-value < 2.2e-16 ## Rejected, because p-value = 2.2e-16 <0.05.

3.6 The scatterplot and the regression line

A scatterplot shows the relationship between two quantitative variables measured on the same individuals. The values of one variable appear on the horizontal axis, and the values of the other variable appear on the vertical axis. Each individual in the data appears as the point in the plot fixed by the values of both variables for that individual. Always plot the explanatory variable, if there is one, on the horizontal axis (the x axis) of a scatterplot. As a reminder, we usually call the explanatory variable x and the response variable y. If there is no explanatory response distinction, either variable can go on the horizontal axis.

Graphical methods can be used to: Detect errors in the data, recognize patterns in the data, explore relationships among variables, confirm or negate assumptions, assess the adequacy of a fitted model, suggest remedial actions (e.g., transform the data, redesign the experiment, collect more data, etc.), and etc. [9] Samprit Chatterjee, Ali S. Hadi, 2012.

```
##--- The scatterplot and the regression line---##
par(mfrow = c(1,1))
plot(Rd$To~Rd$Tp, main="The scatterplot and the fit regression
line",
     xlab="The results of the general test", ylab="Total points",
lwd=3)
## Finding the line of fit for the regression
Reg1<-lm(To~Tp, data=Rd)
summary(Reg1)
```

Coefficients:

	Estimate	Std. Error	t value	Pr(>|t|)	
(Intercept)	22.1364	5.3784	4.116	2e-04	***
Tp	1.5188	0.2311	6.572	9.37e-08	***

```
abline(Reg1,lwd=3, col="red")
```

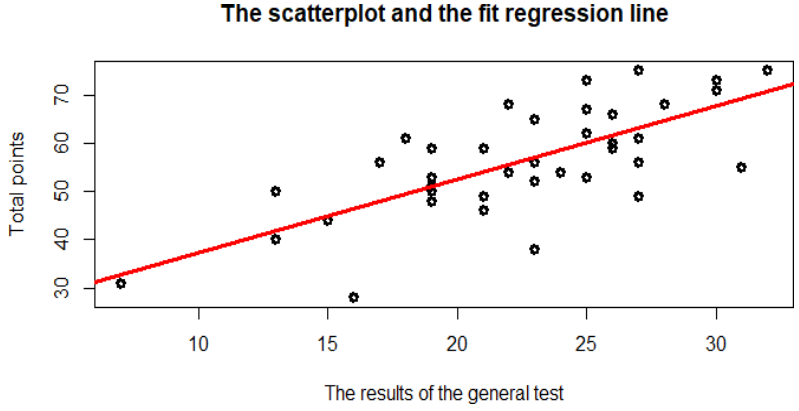

Figure 9: *Linear regression.*

Diagnostics for heteroscedasticity in regression

A test that controls the variance of errors in a regression is called "Breusch-Pagan test" by [10] Breusch, T. S. and Pagan, A. R., 1979, which control the hypothesis if the variance of errors is constant versus

the alternative the error variance changes with the level of response ([8] Palla, I., 2022).

```
ncvTest(Reg1) ## Non-constant Variance Score Test, Variance formula: ~ fitted.values
```

Chisquare = 0.03123473, Df = 1, p = 0.85972

```
plot(fitted(Reg1),resid(Reg1), lwd=3)
abline(h=0,lty=1,lwd=1)
qqnorm(resid(Reg1)); qqline(resid(Reg1), lwd=3)
```

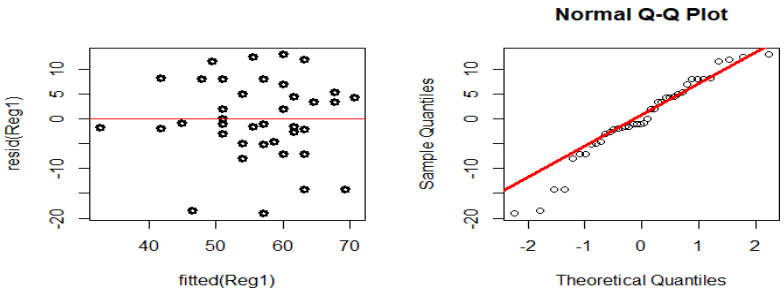

Figure 10: *Diagnostics for heteroscedasticity and normality in regression.*

3.7 Coloring a zone and graph of functions

```
## Coloring a zone
plot(Sek, fn, type = "l", col = "red", lwd = 3, main="Ngjyrosja e pjesëve")
polygon(Sek, fn, density = NA, col = "lightgray", border = NA)
polygon(c(30, Sek[Sek >= 30]), c(0, fn[Sek >= 30]), density = NA, col="green", border = NA)
```

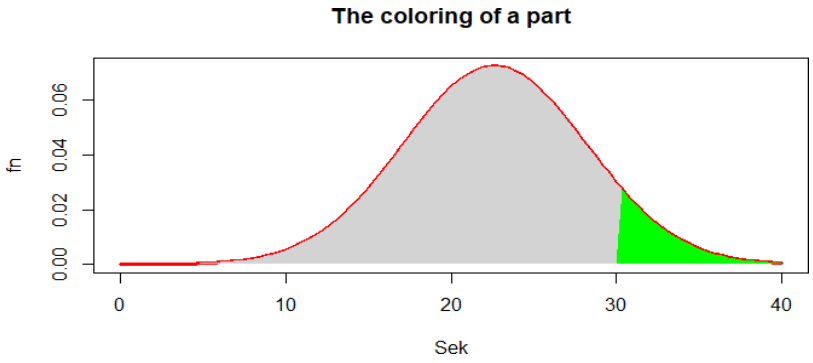

Figure 11: *Coloring areas using the polygon command.*

```
##---Graph of functions ---##
```

```
par(mfrow = c(1,2))
curve(x^2,axes=F,asp=1/1, col="red",xlab="",ylab = "",
      xlim=c(-3,3),ylim=c(-2,4), lwd=3,main= "Graph for y=x^2 and
x^2-1")
abline(h=0,v=0, lty=1, lwd=2)
curve(x^2-1, add=T,col="green", lwd=3)
curve(sin(x),-pi,pi,col="2",lwd=3,asp=1/1,
      main="Graph for sinx and cosx",xlab="",ylab = "",axes=F )
abline(h=0,v=0,lty=1, lwd=2 )
text(x=c(-3.14,-1.57,0.1,1.6,3.14, 3.5), y=c(-0.2, -0.2,-0.2,-0.2,-0.2,-
0.2),
     labels = c("-pi","-pi/2","0","pi/2","pi","x"),cex=1)
text(x=c(-0.1,-0.1), y=c(-1,1),labels = c("-1","1"),cex=1)
abline(h=c(-1,1),v=c(-pi,-pi/2,pi/2,pi),col = "blue",lty = "dotted",
lwd=1)
curve(cos(x),-pi,pi,add=T,col="4",lwd=2)
legend("topright", c("sinx", "cosx"), col = c(2, 4), text.col = "black",
lty = 1, bg = "gray80")
```

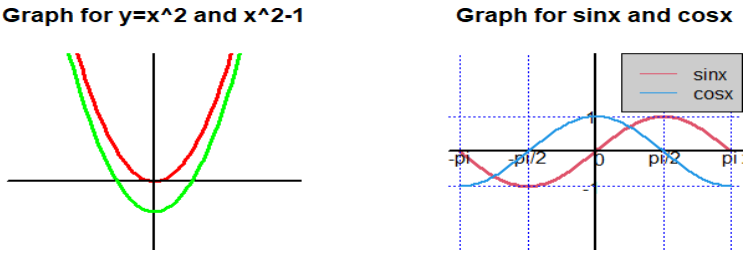

Figure 12: *Graph of functions.*

Conclusions

In this paper, we focused on using the RStudio program to build histograms, bar graphs or pie charts. In statistics, an important place is the construction of the histogram for the data. Also, to understand the relationships between the independent variables and the dependent variable, the scatterplot gives us an initial idea. To diagnose the residuals, the R program uses ready-made commands to present the residuals visually and to check hypotheses regarding the normality of

the data and the heteroscedasticity of the residuals. The R program gives us the opportunity to build graphs of many mathematical functions, using the thickness and colors we want to make these graphs more attractive to the human eye.

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A FIXED- POINT THEOREM FOR A FUNDAMENTALLY NONEXPANSIVE MAPPING IN QUASI- METRIC SPACES OF HYPERBOLIC TYPE

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Abstract
The quasi- metric space is an asymmetric metric space, which was first introduced by W.A. Wilson way back in 1931. It is similar to a metric space, but it does not require the distance function to be symmetric. Quasi-metric spaces have found a wide range of applications in both theoretical and applied mathematics. In recent years efforts have been made in the study of convex structures in these kind of spaces, trying to generalize similar results from convex metric spaces. In our paper we define quasi-metric spaces of hyperbolic type. We prove some results including a fixed point theorem for fundamentally non-expansive mappings in this type of spaces. In this way we demonstrate that many significant findings related to metric spaces of hyperbolic type could also be applied in the context of quasi-metric spaces of hyperbolic type.

Keyword: *quasi-metric space, metric space of hyperbolic type, fixed point, non-expansive mapping*

1. Introduction

Let (X, d) be a metric space and D a nonempty subset of X. The map $T: D \to D$ is called a *self-mapping*. The point $x \in D$ such that $Tx = x$ is called a *fix point*. Since many real world problems can be converted into problems of finding the fixed point of a specific mapping, the study of fixed points has been the subject of extensive research. Perhaps the

most important example of this is the well-known Banach Contraction Principle. It states that if X is complete and the self-mapping T is a contraction, then T has a unique fixed point. Following Banach (1922), there have been numerous articles and monographs that introduce different types of contraction mappings and focus on fixed points and their applications. Refer for example to Kirk (2015) and his references. But fixed point theory has not limited itself only to metric spaces. Without a doubt, a mathematical concept that has also been extensively researched is a metric space embedded with a convex structure. There are different notions of convexity, such as Menger's (1928), Takahashi's (1970) etc. The interplay between convexity, fixed points and various fields of natural science has been explored by numerous researchers through the years, such as Assad & Kirk (1972), Moosaei (2012) and Fukhar-ud-din (2020) just to name a few.

Previously, the study of convexity structures was primarily focused on metric spaces. This is certainly not the case in recent years with Künzi & Yıldız (2016) initiating the study of convex structures in the sense of Takahashi in quasi- metric spaces. While previously, Izadi (2012) had made an effort to introduce the quasi- metric spaces of hyperbolic type. Each of these authors results prompt us to believe that many results from metric spaces with such convex structures can be generalized and applied to quasi- metric spaces.

The focus of our paper are quasi- metric spaces. These spaces were first defined by Wilson (1931) as spaces similar to the metric space (X, d), but without requiring d to be symmetric. As a result, in quasi- metric spaces certain concepts like convergence, continuity, compactness, and completeness differ from their counterparts in metric spaces. Each of these concepts has two versions - forward and backward, corresponding to the two topologies present in quasi-metric spaces, namely the forward and backward topologies (Secelean et al, 2019). Over the past few decades, these concepts and properties have been extensively studied in the context of quasi-metric spaces by numerous authors (you can refer for instance to Aminpour (2012) and Cobzaş (2011) and their references).

In this paper we will introduce the quasi- metric space of hyperbolic type, using Menger's (1928) notation. Our purpose is to show that many significant findings related to metric spaces of hyperbolic type could also be applied in the context of quasi-metric spaces of

hyperbolic type. For our purpose we recall some useful basic definitions and use some preliminary results from Nyirongo (2021) related to Menger's convexity in quasi- metric spaces. In the main section of our paper we prove a fixed point theorem for a fundamentally nonexpansive mapping. Our results are a generalization of Fukhar-ud-din's (2020) results.

2. Preliminaries

2.1. Convex metric spaces

We start by recalling some basic definitions.

Definition 2.1. (Kirk & Shahzad, 2014) Let X be a non- empty set and $d: X \times X \to R^{+}$. For all $x, y, z \in X$, consider the following axioms:

(D1) $d(x, y) = 0 \Leftrightarrow x = y$,

(D2) $d(x, y) = d(y, x)$,

(D3) $d(x, y) \leq d(x, z) + d(z, y)$.

Then d is called a *metric* if all three axioms, (D1), (D2) and (D3), are satisfied. Furthermore, the pair (X, d) is called *a metric space*.

Definition 2.2. (Menger, 1928) A metric space (X, d) is called (*metrically or Menger) convex* if for each $x, y \in X$ with $x \neq y$, and for each $\alpha \in [0,1]$, there exists $z \in X$, such that $x \neq y \neq z$ and:

(i) $d(x, z) = \alpha d(x, y)$

(ii) $d(y, z) = (1 - \alpha) d(x, y)$

Equivalently, a metric space is metrically convex if each $x, y \in X$ with $x \neq y$, $z \in X$, such that $x \neq y \neq z$ and:

$$d(x, z) + d(z, y) = d(x, y)$$

If (X, d) is a convex metric space and $x, y \in X$, then:

$$seg[x, y] = \{z \in X: d(x, z) + d(z, y) = d(x, y)\}$$

is called a *metric segment.*

Menger was the first to discover that in a metrically convex and complete metric space any pair of two distinct points are end points of at least one metric segment.

Definition 2.3. (Kirk, 1982) A metric space (X, d) is said to be *of hyperbolic type* if it contains a family L of *metric segments* such that:

a) each two points $x, y \in X$ are endpoints of exactly one member $seg[x, y] \in L$, and

b) for $u, x, y \in X$ and $z \in seg[x, y]$ such that $d(x, z) = \alpha d(x, y)$ for $\alpha \in [0,1]$, it holds that $d(u, z) \leq (1 - \alpha)d(u, x) + \alpha d(u, y)$.

2.2. Convex quasi- metric spaces

Definition 2.4. (Wilson, 1931) Let X be a non- empty set and $d: X \times X \to R^+$. Then d is called a *quasi- metric* if it satisfies (D1) and (D3). In addition, the pair (X, d) is called a *quasi- metric space.*

Let (X, ρ) be a quasi-metric space. We note that if we define: $\rho^s: X \times X \to R^+$ such that $\rho^s(x, y) = \max\{\rho(x, y), \rho(y, x)\}$ for all $x, y \in X$, then it is easy to see that ρ^s is a metric on X, and for all $x, y \in X$, $\rho(x, y) \leq \rho^s(x, y)$.

Example 2.5. Let $\rho: R \times R \to R^+$ be defined by $\rho(x, y) = \max\{x - y, 0\}$. Then, (R, ρ) is a quasi- metric space. For more examples refer to Secelean et al. (2019).

Let (X, ρ) be a quasi- metric space, then ρ induces a forward and a backward topology (Secelean et al., 2019) generated by the respective open balls. The *forward* and *backward open balls* are respectively defined by:

$$B^+(x, r) = \{y \in X: \rho(x, y) < r\} \text{ and}$$
$$B^-(x, r) = \{y \in X: \rho(y, x) < r\}.$$

They generate the *forward topology* τ^+, and the *backward topology* τ^-. We can also define *symmetric open balls* by $B^s(x, r) = \{y \in X: \rho^s(x, y) < r\}$ and denote the corresponding *symmetric topology* by τ^s. Similarly, we define the *forward, backward closed balls* and denote them by $D^+$and D^-, respectively.

The set $D \subset X$ is called *forward* (respectively, *backward*) closed if its complement is open in τ^+ (respectively in τ^-)

From the asymmetry of ρ, the following definitions come to light, as stated by Secelean et al. (2019).

Definition 2.6. (Secelean et al., 2019) Let $\{x_n\}$ be a sequence in the quasi- metric space (X, ρ). Then:

1) $\{x_n\}$ is *forward convergent* (respectively, *backward convergent*), if it converges with respect to τ^+, (respectively, τ^-).
2) $\{x_n\}$ is *convergent* if it is both forward and backward convergent.

So $\{x_n\}$ is *forward convergent* (respectively, *backward convergent*) to $x \in X$ if and only if $\lim_{n\to\infty} \rho(x, x_n) = 0$, (respectively, $\lim_{n\to\infty} \rho(x_n, x) = 0$). Furthermore, $\{x_n\}$ is convergent if and only if $\lim_{n\to\infty} \rho(x, x_n) = 0$ and $\lim_{n\to\infty} \rho(x_n, x) = 0$.

Definition 2.7. (Secelean et al., 2019) Let $\{x_n\}$ be a sequence in (X, ρ). We say that

1) $\{x_n\}$ is *forward Cauchy* (respectively, *backward Cauchy*) if for every $\varepsilon > 0$, there exists $N \in \mathbb{N}$ such that for every $m > n > N$, it holds that $\rho(x_n, x_m) < \varepsilon$ (respectively, $\rho(x_m, x_n) < \varepsilon$).
2) (X, ρ) is *forward complete* (respectively, *backward complete*), if every forward Cauchy (respectively, backward Cauchy sequence) is convergent.
3) (X, ρ) is *complete*, if it is both forward and backward complete.

Definition 2.8. (Secelean et al., 2019) Let $A \subset X$. Then $\delta(A) = \sup\{\rho(x, y), x, y \in A\}$ is called the *diameter of A*. The set A is said to be *bounded* if $\delta(A) < \infty$.

Definition 2.9. (Secelean et al., 2019) The set A in called *forward compact* (respectively *backward compact*) if every sequence in A has a forward (respectively, backward) convergent subsequence with limit in A. Moreover, A is called compact if it is both forward and backward compact.

When studying fixed points, it is worth noting that the Banach Contraction Principle is also valid in quasi-metric spaces because its triangle inequality (D3) remains the same as in metric space, and the symmetry of the metric is not required in the proof.

Now we turn to the results of Nyirogo (2021) and give the following definitions.

Definition 2.10. (Nyirongo, 2021). A quasi- metric space (X, ρ) is called (*metrically or Menger) convex* if for each $x, y \in X$ with $x \neq y$, and for each $\alpha \in [0,1]$, there exists $z \in X$, such that $x \neq y \neq z$ and:

(i) $\rho(x, z) = \alpha\rho(x, y)$ and $\rho(y, z) = (1 - \alpha)\rho(x, y)$

(ii) $\rho(y, z) = (1 - \alpha)\rho(y, x)$ and $\rho(z, x) = \alpha\rho(y, x)$

Equivalently, by adding the conditions within (i) and (ii) accordingly, we say that a quasi- metric space is metrically convex if each $x,\ y \in X$ with $x \neq y$, there exists $z \in X$, such that $x \neq y \neq z$ and:

$$\rho(x,z) + \rho(z,y) = \rho(x,y) \text{ and } \rho(y,z) + \rho(z,x) = \rho(y,x).$$

Similarly to the metric space, we call

$$seg[x,y] = \{z \in X: \rho(x,z) + \rho(z,y) = \rho(x,y) \text{ and } \rho(y,z) + \rho(z,x) = \rho(y,x)\}$$

a *metric segment* on the quasi- metric space (X,ρ).

If the subset C of X is such that any $x,\ y \in C$ are endpoints of at least one metric segment, then C is called a convex subset of X.

3. Main Results

We start this section by introducing a few definitions.

Definition 3.1. (compare with Def. 2.7 in Ghoncheh and Razani (2014)) Let *T* be a self- mapping on the quasi- metric space (X,ρ). Then:

a) *T* is called *forward fundamentally nonexpansive* if for all $x,y \in X$, $\rho(T^2x,Ty) \leq \rho(Tx,y)$,

b) *T* is called *backward fundamentally nonexpansive* if for all $x,y \in X$, $\rho(Ty,T^2x) \leq \rho(y,Tx)$.

Definition 3.2. A quasi- metric space (X,ρ) is said to be *of hyperbolic type* if it contains a family *L* of *metric segments* such that:

A) each two points $x,y \in X$ are endpoints of exactly one member $seg[x,y] \in L$,

B) for $x,y,u \in X$ and $z \in seg[x,y]$ such that $\rho(x,z) = \alpha\rho(x,y)$ and $\rho(z,x) = \alpha\rho(y,x)$ we have that for $\alpha \in [0,1]$, it holds that:

$$\rho(u,z) \leq (1-\alpha)\rho(u,x) + \alpha\rho(u,y) \text{ and}$$
$$\rho(z,u) \leq (1-\alpha)\rho(x,u) + \alpha\rho(u,y)\ .$$

Following Fukhar-ud-din's (2020) reasoning, Suzuki's (2005) results remain true even in the context of quasi- metric spaces of hyperbolic type. Thus the following lemma holds.

Lemma 3.3. Let $(X,\ \rho)$ be a quasi- metric space of hyperbolic type and let $\{u_n\}$ and $\{v_n\}$ be bounded sequences in *X*. If:

(i) $\rho(u_n,u_{n+1}) + \rho(u_{n+1},v_n) = \rho(u_n,v_n)$ and
$\rho(v_n,u_{n+1}) + \rho(u_{n+1},u_n) = \rho(v_n,u_n)$

(ii) $\limsup_{n\to\infty}(\rho(v_{n+1},v_n) - \rho(u_{n+1},u_n)) \leq 0$ and

$$\limsup_{n\to\infty}(\rho(v_n, v_{n+1}) - \rho(u_n, u_{n+1})) \leq 0$$

Then $\lim_{n\to\infty} \rho(u_n, v_n) = \lim_{n\to\infty} \rho(v_n, u_n) = 0.$

We now prove a generalized version of Fukhar-ud-din's (2020) theorem.

Theorem 3.4. Let *C* be a non-empty compact and convex subset of the quasi-metric space of hyperbolic type *X*. If $T: C \to C$, is forward and backward fundamentally nonexpasive then T has a fixed point.

Proof. We divide this proof in steps.

Step 1. First, let $u_1 \in C$. Since C is convex, we can define a sequence $\{u_n\}$ in C by iteration, with $u_{n+1} \in C$ such that:

$$\begin{cases} \rho(Tu_n, u_{n+1}) = \frac{1}{2}\rho(Tu_n, u_n) \text{ and } \rho(u_{n+1}, u_n) = \frac{1}{2}\rho(Tu_n, u_n) \\ \rho(u_n, u_{n+1}) = \frac{1}{2}\rho(u_n, Tu_n) \text{ and } \rho(u_{n+1}, Tu_n) = \frac{1}{2}\rho(u_n, Tu_n) \end{cases}$$

Next, we can construct the sequence $\{Tu_n\}$, which in turn satisfies the following conditions:

$$\begin{cases} \rho(T^2u_n, Tu_{n+1}) = \frac{1}{2}\rho(T^2u_n, Tu_n) \text{ and } \rho(Tu_{n+1}, Tu_n) = \frac{1}{2}\rho(T^2u_n, Tu_n) \\ \rho(Tu_n, Tu_{n+1}) = \frac{1}{2}\rho(Tu_n, T^2u_n) \text{ and } \rho(Tu_{n+1}, T^2u_n) = \frac{1}{2}\rho(Tu_n, T^2u_n) \end{cases}$$

By adding the above conditions accordingly we get the following:

$$\begin{cases} \rho(T^2u_n, Tu_{n+1}) + \rho(Tu_{n+1}, Tu_n) = \rho(T^2u_n, Tu_n) \\ \rho(Tu_n, Tu_{n+1}) + \rho(Tu_{n+1}, T^2u_n) = \rho(Tu_n, T^2u_n) \end{cases}$$

Now, since *T* is both forward and backward nonexpasive we have that

$$\begin{cases} \rho(T^2u_{n+1}, T^2u_n) \leq \rho(Tu_{n+1}, Tu_n) \\ \rho(T^2u_{n+1}, T^2u_n) \leq \rho(Tu_n, Tu_{n+1}) \end{cases}$$

Following the last two relations, we note that $\{T^2u_n\}$ and $\{Tu_n\}$ satisfy the conditions of the Lemma 3.3. Therefore we have

$$\lim_{n\to\infty} \rho(T^2u_n, Tu_n) = 0 = \lim_{n\to\infty} \rho(Tu_n, T^2u_n)$$

Step 2. Given that C is compact and $\{Tu_n\}$ is a sequence in C, there exist a subsequence of $\{Tu_n\}$ that is convergent both forward and backward. Let Tu_{n_k} be that subsequence and let $u \in C$ be the limit. So we have:

$$\lim_{n\to\infty} \rho(Tu_{n_k}u) = 0 = \lim_{n\to\infty} \rho(u, Tu_{n_k})$$

Step 3. Now we show that u is the fixed point. Indeed, using the triangle inequality we get:

$$\begin{aligned}\rho(Tu, u) &\leq \rho(Tu, T^2u_{n_k}) + \rho(T^2u_{n_k}, Tu_{n_k}) + \rho(Tu_{n_k}, u)\\ &\leq \rho(u, Tu_{n_k}) + \rho(T^2u_{n_k}, Tu_{n_k}) + \rho(Tu_{n_k}, u)\end{aligned}$$

By taking the limit on both sides and combining the results of *Step 1* and *Step 2* the above inequality gives us $\rho(Tu, u) = 0$.
Similarly we have that

$$\begin{aligned}\rho(u, Tu) &\leq \rho(u, Tu_{n_k}) + \rho(Tu_{n_k}, T^2u_{n_k}) + \rho(T^2u_{n_k}, Tu)\\ &\leq \rho(u, Tu_{n_k}) + \rho(Tu_{n_k}, T^2u_{n_k}) + \rho(Tu_{n_k}, u)\end{aligned}$$

From the results of *Step 1* and *Step 2* the above inequality gives us $\rho(u, Tu) = 0$.
Consequently we have shown that $\rho(Tu, u) = 0 = \rho(u, Tu)$, which based on the definition of the quasi- metric space means that $Tu = u$.

Disregarding the lemma and in the light of the results of Banach Contraction Principle for quasi- metric spaces, another fixed point theorem can be derived (Fukhar-ud-din, 2020).

Theorem 3.5. Let *C* be a non-empty compact and convex subset of the quasi-metric space of hyperbolic type *X*. If T: $C \to C$, is forward and backward nonexpasive then *T* has a fixed point.

Proof. Again we divide the proof in steps.

Step 1. Firstly, we fix $x_0 \in C$. Let T_n: $X \to X$, $n \geq 1$. Since *C* is convex, for each $x \in X$, we define T_n as follows:

$$\begin{cases} \rho(x_0, T_n x) = \frac{1}{n}\rho(x_0, Tx) \text{ and } \rho(T_n x, Tx) = (1 - \frac{1}{n})\,\rho(x_0, Tx) \\ \rho(Tx, T_n x) = (1 - \frac{1}{n})\,\rho(Tx, x_0) \text{ and } \rho(Tx_n, x_0) = \frac{1}{n}\rho(Tx, x_0) \end{cases}$$

Then for each $n \geq 1$ and $x, y \in C$ we have:

$$\begin{aligned} \rho(T_n x, T_n y) &\leq \rho(T_n x, x_0) + \rho(x_0, T_n y) \\ &= \frac{1}{n}[\rho(Tx, x_0) + \rho(x_0, Ty)] \leq \frac{1}{n}\rho(Tx, Ty) \leq \frac{1}{n}\rho(x, y) \end{aligned}$$

Similarly,

$$\begin{aligned} \rho(T_n y, T_n x) &\leq \rho(T_n y, x_0) + \rho(x_0, T_n x) \\ &= \frac{1}{n}[\rho(Ty, x_0) + \rho(x_0, Tx)] \leq \frac{1}{n}\rho(Ty, Tx) \leq \frac{1}{n}\rho(y, x) \end{aligned}$$

This shows that for each $n \geq 1$, T_n is a contraction. By the Banach Contraction Principle this implies that each T_n has a fixed point $x_n \in C$. Meaning that for each $n \geq 1$, $T_n x_n = x_n$ holds.
Moreover, the definition of T_n implies that $\lim_{n\to\infty} \rho(x_0, Tx_n) = 0 = \lim_{n\to\infty} \rho(Tx_n x_0)$.

Step 2. Since *C* is compact for $\{x_n\} \in C$ there exists a subsequence that converges in *C*. Let $\{x_{n_k}\}$ be the subsequence and $x \in C$ its limit.

Now, since C is compact, it is also bounded. Thus, we have:

$$\rho(Tx_n, x_n) = \rho(Tx_n, T_n x_n) = (1 - \frac{1}{n})\,\rho(Tx_n, x_0) \xrightarrow[n\to\infty]{} 0$$

Similarly we have:

$$\rho(x_n, Tx_n) = \rho(T_n x_n, Tx_n) = (1 - \frac{1}{n})\,\rho(x_0, Tx_n) \xrightarrow[n\to\infty]{} 0$$

Step 3. We show that $x \in C$ is a fixed point. Indeed, we have:

$$\begin{aligned} \rho(Tx, x) &\leq \rho(Tx, Tx_{n_k}) + \rho(Tx_{n_k}, x_{n_k}) + \rho(x_{n_k}, x) \\ &\leq \rho(x, x_{n_k}) + \rho(Tx_{n_k}, x_{n_k}) + \rho(x_{n_k}, x) \xrightarrow[n\to\infty]{} 0 \end{aligned}$$

$$\rho(x, Tx) \leq \rho(x, x_{n_k}) + \rho(x_{n_k}, Tx_{n_k}) + \rho(Tx_{n_k}, Tx)$$

$$\leq \rho(x, x_{n_k}) + \rho(x_{n_k}, Tx_{n_k}) + \rho(x_{n_k}, x) \xrightarrow[n\to\infty]{} 0$$

This proves that $\rho(Tx, x) = 0 = \rho(x, Tx)$, i.e. $Tx = x$.

Example 3.6. Consider the quasi- metric space of hyperbolic type (R, ρ) where $\rho(x, y) = \max\{x - y, 0\}$, for $x, y \in R$. Let $C = [0,1]$. Then C is a compact convex subset of R. We define $T: C \to C$ such that $Tx = x^2$ for $x \in R$. Next we show that T is forward and backward fundamentally nonexpansive and that (as stated in Theorem 3.4) it has a fixed point.

Let $x, y \in C$ and suppose that $x < y$. Then

$$Tx = x^2, T^2x = x^4, Ty = y^2.$$

Consequently, we have:

$\rho(T^2x, Ty) = \max\{T^2x - Ty, 0\} = \max\{x^4 - y^2, 0\} = 0.$

$\rho(Ty, T^2x) = \max\{Ty - T^2x, 0\} = \max\{y^2 - x^4, 0\} = y^2 - x^4.$

$\rho(Tx, y) = \max\{Tx - y, 0\} = \max\{x^2 - y, 0\} = 0.$

$\rho(y, Tx) = \max\{y - Tx, 0\} = \max\{y - x^2, 0\} = y - x^2.$

Therefore,

$$\rho(T^2x, Ty) \leq \rho(Tx, y) \text{ and } \rho(Ty, T^2x) \leq \rho(y, Tx),$$

And T is fundamentally nonexpansive. Hence it has a fixed point, which is $x = 0$.

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AN EFFICIENT TECHNIQUE TO RECONIZE THE CAPACITY OF INFLUENCE IN THE FRAMEWORK OF LEADERSHIP SKILLS

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Abstract
An important group, within leadership skills, known as influencing skills, are related to a person's capacity to influence others or the course of events. In this aspect, some attitudes, practices and personal characteristics help a lot to increase or decrease a leader's influence in decision-making. Some people underestimate their capacity to influence others while others overestimate and are delusional about their capacity. The latter are not sufficiently sensitive to the real impact of their behavior.
A truly capable person generally has a good knowledge of himself, that is, he is capable of self-observation (introspection), but he is also capable of empathy, that is, of knowing what another person experiences.
The technique presented in this paper is based on a set of practices, attitudes and characteristics of increasing or weakening a person's influence and credibility. This technique is based on two assessments:
Introspection (the image the leader has of himself) and Empathy (how others perceive me). The evaluations are given according to the four-level ordinal scale. SPSS software is used for the statistical analysis of the data in this study.

Keywords: *Leadership skills, political skills, capacity of influence, introspection, empathy.*

Introduction
Leading the employees engaged in labor relations in economic or social organizations, in state or private institutions is an important and necessary task. The leadership process means an ensemble of skills to conduct an efective leadership. The more these skills are acquired and used, the more fruitful the organizational and institutional direction and progress will be. From this point of view, the field of leadership skills

is an area of interest for researchers of various disciplines such as scientific, social, economic, managerial, etc.

This paper aims to highlight some special aspects within the framework of leadership skills, in the institutional area, such as the skills to influence the people with whom the leader is in interdependent relationships, as well as the directions and solutions of the problems. These skills are also called political skills (Francine H-G, p.46) and play an extraordinary role in the effectiveness of leadership. Examining these skills allows us to better see the role that they allow leaders to increase their influence within an institution. Our interest as well as the objective of the analysis is the process of how these skills unfold in the university environment.

Universities as consolidated institutions clearly demonstrate the framework of leadership influence skills. The framework of influence of people and problems is a normal occurence that requires proper attention. To illustrate this phenomenon in several profiles, this study is based in the "Fan S Noli" University of Korca.

Naturally, the analysis of the abilities of influence in the leadership led us to the recognition of the capacity of influence in order to have a more realistic view of this ability. In order to realize this we are based on many advanced world ideas and experiences to guide our study regarding the capacity of influence, test models and statistical analysis. In this paper, we have paid special attention to a test arranged in the format of a questionnaire, the ordinal scale of the measure and 33 statements that present practices, attitudes and personal characteristics, which, as the case may be, strengthen or undermine influence.

A leader is a person in charge of organizing, managing and guiding the others. Leadership is a necessary task that contains a set of activities and responsibilities. For this reason, leadership is an art based on the development of certain skills related to "intervention by exercising a role of responsibilities" (Archambault G juillet 2004:6). This is also evident in educational institutions and especially those of higher education, universities.

This task is performed by engaging a complex of personal qualities of leaders at every level. These qualities are part of the personality, professional, cultural training and ethical and moral values, etc. From our surveys with professionals and leaders of different levels in educational institutions, the most valued are: personality, judgement,

honesty, loyalty and patience. A group of questions is made to professionals, leaders as well as students of the Master of Science. The test was conducted in three groups, distinguishing these 4 features that together were evaluated 100 points. Their distribution is presented in the following table.

Table 1 The distribution of the opinions for personality, judgement, honesty, loyalty and patience

	Educational leaders	**Students of Master of Science**	**University pedagogues**
Personality	**14**	**18**	**17**
Judgement	**71**	**62**	**63**
Honesty and loyalty	**10**	**12**	**13**
Patience	**5**	**8**	**7**
Total	**100**	**100**	**100**

The assessments related to judgment are higher because it is quite complex, it includes in itself a set of special skills related to influence. In successful leaders or administrators who are placed in leadership and influential positions, a set of special skills is observed, which are called influence skills or political skills. (Francine H-G;,p. 47) These leaders know very well that to lead it is not enough to analyze an issue well or to compile an action plan, but also to influence other people with whom they are associated. This is about mastering the skills of influence.
In previous works in leadership based in texts, manuals, articles, etc., the influence skills often do not have a clear status. Many researchers have looked at them in part in the function of their analyses. For this reason, the influence skills still remain an aspect to be looked at carefully in their complexity. Many authors consider political skills as "the art of mobilizing the power resources available in an organization". (Francine H-G; p 46). But if we use the term "art", it

rather means "the ability to do something", the knowledge to act instinctively or intelligently and which is something more than the application of a simple technique or the punctuality in a recipe. "To know how to act" means to use the ability to influence your will on others, so it means to use power. For this reason, this skill is often called "political".

So "political skills" or influence skills are: knowing how to argue, knowing how to convince, knowing how to negotiate, knowing how to find supporters, knowing how to choose allies, etc., all of these are related to the art of mobilizing available power sources (Francine H-G;,p 48).

These skills that we call political are present in the leadership activity of every university. We can also consider these institutions as power structures for the reason that they are arenas of power. They work by distributing authority and clearly presenting the influence. In general, organized and consolidated institutions (such as universities) also serve as banks of power, granting the persons operating there competences, statuses and responsibilities, which serve as the basis of power.

So, we can say that universities serve as banks of power. They distribute powers, positions and responsibilities. For example, "Fan Noli" University of Korça, as a consolidated organization, based on legal and bylaws (Higher Education Law, Statute and Internal Regulations) defines many powers and responsibilities from the people placed in these positions. If we refer to the analytical structure and organization, we have approximately 74 leadership positions in UNIKO (University of Korça, Tables 2 and 3) .[1]

Table 2 Distribution of academic positions at UNIKO

Academic positions	
Rector	1
Vice rector	2
Dean	4
Vice dean	4
Head of department	14

[1] UNIKO's analytical and organizational structure, UNIKO's internal regulation

Head of teaching-research group	4
Senator	21
Total	**50**

Tabela 3 Distribution of administrative positions at UNIKO

Academic postitions	
Administrator	1
Directories in the Rectorate	4
Directors of the Directories	8
Administrators in the faculties	4
Administrative Council	7
Total	**24**

Most of these positions are obtained on the basis of university elections (academic positions) and competition (administrative positions). Anyone who reaches a certain position gains a portion of the authority that emanates from the university. This is the initial capital of power. He who knows how to use this initial capital is considered skilled. The better this initial capital is used, the more it increases or, on the contrary, it decreases, narrows. Thus universities are characterized by rivalry because the functions of power are limited in number. People who want to have influence are often in competition during elections or their appointment to a position or for the support of a person with a high position, or for their competences in the field of responsibilities. Power does not come only from above and to use it, leaders need to be supported at the base, more precisely, to be supported by their subordinates and colleagues. If the subordinates support their leader enthusiastically and effectively, power is strengthened, on the contrary, they withdraw the support and undermine his credibility, they shake the basis of his power. This also happens to colleagues at lower levels and without their support it is almost impossible to have real influence. But power in the framework of a university should not be understood as a result of individual powers. This power lies in the groups and regroupings which by combining the power of as many persons as possible increase it effectively. Here we are talking about internal alliances and coalitions that function as forms to achieve the

university's objectives as best as possible. In those university institutions that are generally well run, there is a coalition between the leaders and power is consolidated around a central figure with sufficient authority, but who is in cohesion with the solidarity of the members. This ensures the unity of the management team while strengthening the power of each person.
But it should be known that there are also secret alliances that intentionally or unintentionally aim to weaken the power within a university.
There are several circumstances that make the race active, the competition for power, such as:
1. University election campaign
2. Implementation of the project of a reform that consists of job cuts, personnel cuts
3. Merging or restructuring of departments and faculties
4. Change of leaders
5. Change of owner (Private Universities).
The same thing happens when the leadership is weak and unstable and is not able to form real qualifications (eg the University of Korca in 1998-1999). In these situations, irritations, increased tension, why not even intrigue or conspiratorial actions are observed.
The internal political life of universities is an aspect within their organic structure. In any period in the relations between people operating within a university there is a political universe in which a career develops. A person's leadership skills are related to his capacity to influence others or to influence the course of development processes. These skills are defined as the art of influencing the behavior of others, of changing the course of things, that is, as the art of mobilizing the growth of power resources and available influences.

Influence Capacity

Can we know the influence capacity of a person or a group of people? How can we express it in a quantitative assessment?
To give an answer to the above questions, we will use a questionnaire that contains 33 statements about some attitudes, practices and personal characteristics that cause to increase the influence of an individual even when others try to harm him. (Archambault G juillet 2004,:83)

Also, some individuals underestimate their capacity to influence others. These people are not sensitive enough to the real impact of their behavior. A truly capable person generally has a good knowledge of himself, that is, he is capable of self-observation (introspection) and is not deluded a priori in the assessment that his personality is in itself strong or acceptable. But he is also capable of empathy so he is able to understand and recognize what another person experiences. Let's focus a little on these concepts that will serve as the variables of the questionnaire.

Introspection (Wikpedia, the free Encyclopedia (2),(21)) is the examination of one's own conscious thoughts and feelings. In psychology, the process of introspection relies on the observation of one's mental state, while in a spiritual context it may refer to the examination of one's soul. Introspection is closely related to human self-reflection and self-discovery and is contrasted with external observation. is an ability to know oneself, self-observation and self-understanding, i.e. a recognition of one's own characteristics.

Empathy (Psychology and health, magazine and the portal *psikologijaadheshendeti.com*/2449-2/) is the ability to put oneself in the position of another: that is, the ability to understand the situation from the other's point of view.

These two conceptual definitions will help us to recognize the capacity to influence: attitudes, practices and personal characteristics.

The leader's influence skills are often related to his capacity to read the situation, to make a choice of appropriate techniques, to behave ethically in order to influence the developing processes.

Test Technique

The list of the below statements represents a set of practices, attitudes and characteristics suitable for favoring or damaging a person's influence and credibility. The elements are presented in the form of questions and the person is invited to say to what extent they characterize each one. For each of the elements of the list it is useful to ask two questions: (/Archambault G;Habilites de direction,Ascona juillet 2004,p (84-86)/[2] .)

[2] This list is elaborated based on the test of Prof. Guy Archambault (Habilites de direction; 25-30 juillet 2004 p83-86)

I. What image do I have of myself? (column ***Me***). For this question the scales are as follows:

This element characterizes me			
1	2	3	4
Very little	A little	Average	A lot

II. How do others perceive me? Do I have an opinion? (column ***Others***). For this question the scales are as follows:

My opinion on how others perceive me			
1	2	3	4
Ignore	Weak	Average	Good

	Me	Others
1. I tend to spend all my time interacting with others in order to influence them.		
2. Under the pretext of being honest and transparent, I directly present my proposals and behaviors, pressuring others and provoking defensive reactions in them to reduce my influence.		
3. When I defend my ideas I am sure of myself that I do not give sufficient consideration to the ideas of others and their merits.		
4. I am hesitant when presenting my ideas to the extent of weakening content and strength.		
5. I tend to be withdrawn sometimes when discussing problems that I want to influence.		
6. Being a person that others trust, I am naive in terms of taking care of certain situations.		
7. I find it difficult to cope with certain things or situations in front of others.		
8. I am a person who often distrusts and accepts the intentions of others.		
9. I tend to be arrogant in front of people who object me.		

10. I tend to manipulate others to protect my interests.		
11. I tend to talk a lot in group meetings.		
12. I tend to talk a little about the same situation.		
13. I am ambitious in the matter of appearing threatening to others.		
14. In my relationships with a person, I have concern and capacity to evaluate the part of his acceptance of my ideas.		
15. In a group meeting, I have concern and ease in motivating the participation of others.		
16. I am realistic in my ideas and in the possibilities of judging their weaknesses.		
17. I am a person often indirect in their proposals to the point of creating ambiguities on the real meaning of my messages and actions.		
18. I am quite careful in choosing the right expressions and words with my interlocutors.		
19. I bring new ideas and I am capable to present them with examples.		
20. In general, I have a sense of humor and am able to defuse situations of irritation.		
21. I am generally clear and quite curious in the way I express my ideas.		
22. I am interested in the ideas and projects of others, I ask them questions and in their answers I ask them to explain their position with examples.		
23. I often refer to what others have said and what seems appropriate to me.		
24. I can easily reformulate, in my proposals, the words, ideas or thoughts of others.		
25. I tend to be discreet about my technical competences.		
26. I am one of the first people to intervene in a group discussion.		
27. I tend to become defensive when my ideas or projects are opposed.		

28. I look first for the consequences for what I say and what I do.		
29. I tend to interrupt others when they are talking.		
30. I am an empathetic person.		
31. I spend energy to understand others as much as I need to understand them.		
32. I am a good negotiator.		
33. I tend not to expose myself and defend my ideas and beliefs sufficiently.		

The above questionnaire can serve as a technique to examine the influence capacity of an individual where everyone can express their opinion about each statement (33 statements) related to the questions: How much does this statement characterize me? (column Me) and the question How do others perceive me? (column Others). Opinions are expressed in ordinal scale (1,2,3,4). The data analysis in this case is carried out by finding the mean, median and standard deviation in each column (Me, Others) and then comparing the results. Their comparison leads to the significant results of the test. The questionnaire was given to a group of liders in "Fan S Noli" University of Korça to test their influence capacity.

Materials and Method

This study was conducted during the academic year 2023-2024 and the respondents are part of the academic and administrative staff of Fan S. Noli University who hold management positions. 59 respondents with a composition of 67% women and 33% men participate in the study. While 34% of the respondents are part of the academic staff and 16% are part of the administrative staff of the university. The respondents were informed in advance with the purpose of the study and were given the appropriate instructions for completing the questionnaire. The main purpose of this questionnaire is to evaluate the capacity of influence based on two main axes: self-observation (introspection) and empathy. The questionnaire is organized into 33 questions for each of the elements: Me and Others and aims to measure the perception of the respondents regarding the elements in each of the statements in the questionnaire.

The statistical package SPSS (version 20) was used to perform the presentation and statistical analysis of the data.

Results of the Statistical Analysis

The individual analysis of statistical data consists in the comparison we make between some of the elements of descriptive statistics in the responses of the respondents between the group-questions Me and Others. Based on these data, judgments can be made regarding the influence capacity, obtaining a more realistic judgment about the influence.
For all questions, the mean, median and standard deviation is calculated and comparisons are made. Although the mean and standard deviation are generally not used for categorical data, given that we have ordinal data, we have calculated them to have an idea of the nature of the respondents' answers:

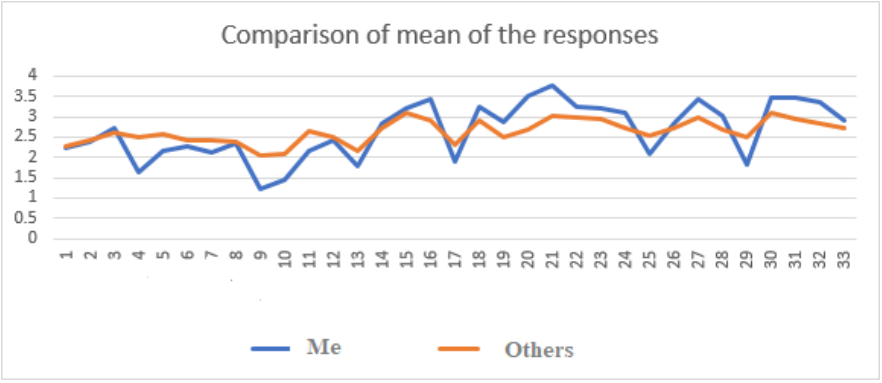
Table 4 Descriptive statistics elements for all questions [3]

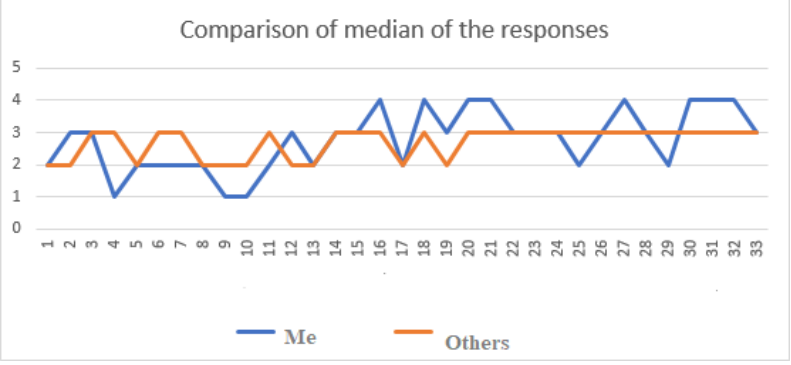
Me				**Others**		
Questions	**Mean**	**Median**	**Std. Dev.**	**Mean**	**Median**	**Std. Dev.**
Question 1	2.22	2.00	.951	2.26	2.00	.915
Question 2	2.39	3.00	1.033	2.43	2.00	.788
Question 3	2.74	3.00	.864	2.61	3.00	.583
Question 4	1.65	1.00	.832	2.48	3.00	.593
Question 5	2.17	2.00	.937	2.57	2.00	.788
Question 6	2.26	2.00	1.054	2.43	3.00	.843
Question 7	2.13	2.00	1.100	2.43	3.00	.992

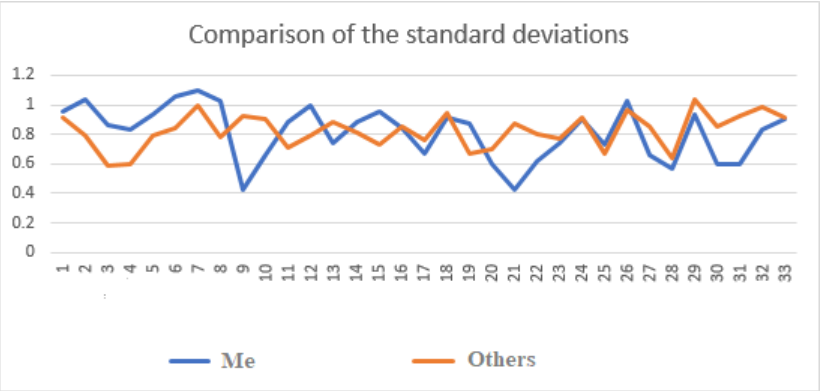
[3] The analysis was carried out without taking into account the division into groups of statements

Question 8	2.35	2.00	1.027	2.39	2.00	.783
Question 9	1.22	1.00	.422	2.04	2.00	.928
Question 10	1.43	1.00	.662	2.09	2.00	.900
Question 11	2.17	2.00	.887	2.65	3.00	.714
Question 12	2.43	3.00	.992	2.48	2.00	.790
Question 13	1.78	2.00	.736	2.17	2.00	.887
Question 14	2.83	3.00	.887	2.74	3.00	.810
Question 15	3.22	3.00	.951	3.09	3.00	.733
Question 16	3.43	4.00	.843	2.91	3.00	.848
Question 17	1.91	2.00	.668	2.30	2.00	.765
Question 18	3.26	4.00	.915	2.91	3.00	.949
Question 19	2.87	3.00	.869	2.48	2.00	.665
Question 20	3.52	4.00	.593	2.70	3.00	.703
Question 21	3.78	4.00	.422	3.04	3.00	.878
Question 22	3.26	3.00	.619	3.00	3.00	.798
Question 23	3.22	3.00	.736	2.96	3.00	.767
Question 24	3.09	3.00	.900	2.74	3.00	.915
Question 25	2.09	2.00	.733	2.52	3.00	.665
Question 26	2.83	3.00	1.029	2.74	3.00	.964
Question 27	3.43	4.00	.662	3.00	3.00	.853

Question 28	3.04	3.00	.562	2.70	3.00	.635
Question 29	1.83	2.00	.937	2.48	3.00	1.039
Question 30	3.48	4.00	.593	3.09	3.00	.848
Question 31	3.48	4.00	.593	2.96	3.00	.928
Question 32	3.35	4.00	.832	2.83	3.00	.984
Question 33	2.91	3.00	.900	2.74	3.00	.915







In order to better identify the tendency in the responses of the respondents of the questionnaire's statements, several subgroups of the questions are constructed as follows:

The first subgroup includes statements: 1, 2, 3, 4, 9, 10, 13, 17, 25, 29, 33 and include the questions that aim weakening the capacity of influence, the second subgroup includes statements: 6, 8, 11, 19, 20, 22, 23, 24, 28, 30, 31 and are questions with a neutral tendency in terms of influence capacity, while the third subgroup includes questions: 5, 7, 12, 14, 15, 16, 18, 21, 26, 27, 32 that aim strengthening the influence capacity.

The analysis technique is applied in the same way as above by first comparing the mean, median and standard deviation within each subgroup, considering that averaging within each subgroup allows us a comparison and a numerical interpretation. Before constructing the variables for each subgroup, we calculated Cronbach's alpha, since an acceptable value enables us to perform more specific statistical analyses. Cronbach's alpha was acceptable (>=0.7) for all subgroups in the study.

For each of the subgroups, we constructed a variable by averaging and then calculated the mean, median and standard deviation (Table below):

Table 5 Descriptive statistics elements for the variables of each subgroup.[4]

	Subgroup I		Subgroup II		Subgroup III	
	Me	**Others**	**Me**	**Others**	**Me**	**Others**
Mean	2.0158	2.3755	2.9763	2.7352	2.9881	2.7945
Median	2	2.3636	3.0909	2.8182	3	2.8182
Std. Dev.	0.35596	0.41597	0.34039	0.41652	0.41052	0.44723

If we compare the means and medians, it is noticed that for the first subgroup, in the questions that aim weakening the capacity of influence, the characteristic elements of the questions of this subgroup are more pronounced in the perception that others have of individuals than in the respondents' image of themselves. This means that in the questions that aim weakening the capacity of influence, the perception that others have on the respondents is more pronounced than the respondents' image of themselves.

In the questions of the second subgroup, it is noticed that the characteristic elements of the questions are more pronounced in the respondents' image of themselves, than in the perception that others have of them. A similar situation is observed in the third subgroup, in the questions that aim strengthening the capacity of influence, where again there is a more pronounced tendency in the respondents' image of themselves, than in the perception that others have of them.

In each of the above-mentioned cases, it is studied if these changes in each of the categories are statistically significant, and to realize this we use the Wilcoxon signed rank test in SPSS. In this way, we can see elements related to introspection and empathy according to the specifics of each subgroup, focusing on the measurement of these elements in the surveyed subjects. The test results are as follows:

In the case of the first subgroup, the Wilcoxon test shows that we have a statistically significant difference between the responses in the categories Me and Others ($Z=-3.425$, p-value$=0.001<0.05$).

In the case of the second subgroup, the Wilcoxon test shows that we have a statistically significant difference between the responses in the categories Me and Others ($Z=-2.904$, p-value$=0.004<0.05$).

[4] Statistical analysis was carried out by considering the three groups of the statements.

In the case of the third subgroup, the Wilcoxon test shows that we have a statistically significant difference between the responses in the categories Me and Others (Z=-1.983, p-value=0.047<0.05).
So, in all cases it is observed that there is a statistically significant difference in the respondents' image of themselves and the opinion of how others perceive them.

Conclusions

Based on the results of the statistical analysis on the conducted survey, a diversity of answers is observed for each of the questions of the questionnaire, where in a large part of the questions there is a significant difference in terms of the mean and median.
During the comparison of the subgroups, related to the categories Me and Others, for the subgroup where the weakening of the influence capacity is aimed, we have a situation where the characteristic elements of the questions of this subgroup are more pronounced in the perception that others have of the individuals than of the image of respondents to themselves. While in the other two subgroups, that is, where we have a neutral approach and where the aim is to strengthen the capacity of influence, it is noticed that the characteristic elements of the questions are more pronounced in the respondents' image of themselves, than in the perception that others have for them.
Regarding the difference in each of the subgroups regarding the respondents' image of themselves and the opinion of how others perceive them, it was observed that in all three subgroups, there was a statistically significant difference regarding these elements. So there is a statistically significant difference in respondents' self-image and how they think others perceive them.
So as a conclusion, we can say that from the conducted survey, a statistically significant diference is noted on the image of the respondents on themselves and on the way they perceive others. In the questions that aim strengthening the capacity of influence and in questions with a neutral approach, we have a higher ranking of the characteristic elements related to their self-image, while in the questions that aim weakening the capacity of influence, we have a higher ranking high in respondents' opinion of how others perceive them, having a self-image that was slightly characterized by the group of questions.

Suggestions

Based on the results of the statistical analysis as well as the conclusion of the study, below, we can present some suggestions related to increasing the capacity of influence in the management process. Thus a person exercising the responsibility of a leadership is interested in increasing his capacity of influence and developing this ability. For this purpose, he must take into account:

- Time and place of intervention to do or say something.

What is the right moment? What are the consequences of a bad "timing"? What is the appropriate place to say something? What are the consequences of a bad choice? So, the person in charge must choose the most suitable moment to speak a work meeting on a topic that is close to his heart. Also, he must evaluate the risks and advantages of saying or doing something at a given moment.

-Realistic evaluation of recognition by others, of visibility by members of the group he leads.

Thus, others must recognize the personal expertise of the leader. How should it be made known without being misinterpreted? The person in charge must provide strong support for an idea or a project.

Based on the results of the statistical analysis as well as the conclusion of the study, below, some suggestions are presented related to increasing the capacity of influence in the management process:

1. Realistic evaluation of recognition by others, of visibility by members of the group he leads.

Therefore, others must recognize the personal expertise of the leader. How should it be made known without being misinterpreted? The person in charge must provide strong support for an idea or a project.

2. Realistic knowledge of the groups and persons that the leader intends to influence.

Therefore, he must know where the resistance and objections to his ideas and projects may come from. He must assess the risks and chances of success of the ideas and projects initiated by him. Likewise, he must know how to integrate the interests of the group or organization with personal interests.

3. Elaboration of his personal attitudes and behaviors as a leadership.

In this context, he must be energetic and consistent in his efforts, be transparent in his relations with others, but especially careful and aware

of the fact that giving power to others means generally contributing to increasing your influence as a leader.

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GENDER BALANCE IN CAREER PROGRESSION AND SCIENTIFIC RESEARCH IN TERTIARY EDUCATION

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Abstract
Gender balance in career progression and scientific research is one of the areas of intervention identified by the European Commission concerning gender mainstreaming in higher education institutions. Gender mainstreaming ensures that women and men have equal access and control over resources, opportunities and benefits at all levels. The paper aims to analyse gender indicators on career progression and scientific research at the University of Korca. The analysis includes indicators related to the gender ratio of participation in national and international research projects; progression in the academic career path, and the academic and administrative staff's perception of the institution's commitment to promoting gender balance in career development. Data was provided through a survey. A questionnaire was conducted to measure the academic and administrative staff's perception of gender mainstreaming in the university. The questionnaire was administered to the University of Korca. The standardisation criteria of the measured indicators were considered. The participants in this study were the academic and administrative staff of the University of Korca. There were 116 participants in the questionnaire. Descriptive statistics and statistical tests were used for data interpretation and presentation. Data showed that UNIKO represents a higher education

institution which acts to address gender issues and increase involvement in promoting the values of equality and inclusion. However, the gender gap in career progression is still present. This may lead to further analysis of career obstacles at the individual and cultural level.

Keywords: *career advancement, gender balance, gender gap, scientific research*

Introduction

Improving the representation of female academics in higher education institutions throughout their careers remains of great importance in promoting gender equality in society as a whole. Gender balance in career progression and scientific research is one of the areas of intervention considered by the European Commission regarding gender mainstreaming in academia. In most countries, progression in academic careers follows a well-established path. Over the last 50 years, female student share in higher education has continuously increased over time globally and across almost all world regions (UNESCO 2017). While women are obtaining academic degrees at greater proportions than before, they remain underrepresented in the highest level of career progression in academia (Cotter et al. 2001; Elacqua et al. 2009; Mantai & Marrone 2023). Career stages in universities are defined according to the classification of the European Commission, DG for Research and Innovation, which consists of four levels: up to PhD (student's phase), PhD holders (Grade C), associate professors, established researchers that have developed a level of independence (Grade B), and full professors (Grade A). European Commission (2021) recommends recruitment, selection and career progression support measures to ensure that women and men get equal chances to develop and advance their scientific careers. Though the gender gap has slowly narrowed in the last decades, career advancements are still much easier for men. Studies show several causes of gender imbalance in women's career progression, contributing to female researchers' horizontal and vertical segregation (Kerimova 2021; Morettini & Tani 2023). At a macro-level, society dictates gender roles which influence and restrict women's and men's choices. At a middle level, organisational cultures and procedures can be gender-biased (or even blind) which constrains women's career progression. At a micro-level, female researchers may lack incentives to achieve their full potential. Studies reveal that

women progress slower through the academic ranks and academics continue to experience gender differences (David & Woodward, 1998). In the EU in 2018, women represented 47% of assistant professors, 40% of associate professors and 26% of full professors (European Commission, 2021). Regarding Albanian tertiary education data from INSTAT (2023) show that the number of graduates in tertiary education in the academic year 2021-22 was around 31 thousand students, of whom 66.3 % were girls. Despite this, the gender ratio in Albanian academic staff shows a low percentage of women in the highest level of academic rank. According to INSTAT during the academic year 2021- 2022, women represented 67% of lecturers (grade C), 61% of associate professors and 38 % of full professors among effective academic staff in Albanian public tertiary education. During the last years, there has been significant commitment regarding gender equality policies by Albanian universities. Almost all Albanian universities have drafted and approved their gender equality plans. The University of Korca has also made significant efforts to strengthen gender equality in university life. Women represent 63.1% of students and academic staff in UNIKO during the academic year 2022- 2023. The paper aims to analyse gender indicators on career progression and scientific research at the University of Korca. The research paper is based on analysis and interpretations of indicators regarding the gender ratio of participation in national and international research projects; progression in the academic career pathway, and academic staff's perception of the institution's commitment to promoting gender balance in career development. The aim is to increase understanding of how gender is played in academia across different roles and different career stages.

Methodology

The research was methodologically based on a quantitative data collection method. Data was provided through a survey. A questionnaire was conducted to measure the academic and administrative staff's perception of gender mainstreaming in the university. The questionnaire was administered to the University of Korca. The standardisation criteria of the measured indicators were considered. To meet the standardisation criteria of the research

instrument, the Guideline for Gender Mainstreaming Academia by EIGE (2016) was used.

Participants in the survey

The participants in this survey were the academic and administrative staff of the University of Korca. They were contacted purposefully and invited to complete the questionnaire.

There are 116 participants in the questionnaire, 26.7 % males and 73.3 % females. This gender distribution in the sample is due to the percentage of gender distribution in the university staff. Also, 70.7 % of the respondents are academic staff, and 29.3% are administrative staff of the university.

This survey was conducted during the academic year 2022-2023 and the respondents were recruited from the four faculties of the University of Korca and the university administrate. Before submitting the questionnaire, the respondents were informed about the survey and all the necessary explanations regarding the questionnaire.

Data analysis

Both the statistical package SPSS 20 and Excel 16 were used to conduct the data analysis. First, we used some charts to present the responses by gender in the questions regarding their participation in selection committees. Then we used Chi-square Tests to identify the response differences by gender.

Research Results and Discussions

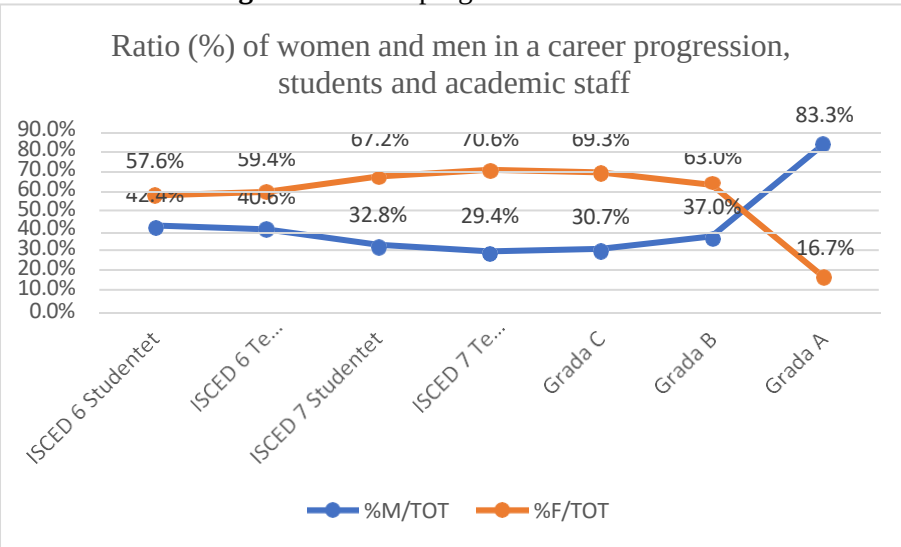
Career progression pathway

Gender balance in decision-making, recruitment and career progression is one of the areas of intervention identified by the European Commission regarding gender mainstreaming in university and academic institutions. Referring to the data related to career progress by gender, starting from the status of 'student' and continuing to lecturer (Grade C), associate professor (Grade B) and full professor (Grade A) there is a decrease in the percentage of women. Analysis from UNIKO concerning the career progression among academic staff shows that women represent 69.3% of academic staff grade C (lecturer) of UNIKO. The presence of women is reduced in the next stage Grade B (associate professor) with women representing 63. 0% of the academic staff Grade B and when it comes to the top position of the academic

career, full professor the percentage of women is too low. Women represent only 16.7 % of the academic staff in Grade A. Figure 1 shows the ratio (%) of women and men in a career progression, starting from students and academic staff in UNIKO.

As shown in the figure a significant decline in the percentage of women at UNIKO at the highest stage of their academic career is noted. This gender imbalance in career progression is present in all Albanian universities. There is a similar gender inequality in academia in many countries across Europe. Reports show that women are under-represented at the highest level in academia (ETUCE 2023).

Figure 1: Career progression in UNIKO



Participation in research projects

Participation in research projects is important to improve the academic staff's perspective and career progression. This indicator has become the subject of the survey with the academic staff to provide a reflective picture of the ratio of men and women as participants in national and international research projects. In this regard, respondents were asked about their participation in such research projects. Data from the survey showed a low percentage of the academic staff participating in the research projects. 21.6% of the respondents have participated in research projects funded by UNIKO and only 18.1% have participated

in international research projects funded by the EU. Analysis of this indicator by gender shows a gender balance in participating in national and international research projects among the academic staff of UNIKO, with a low dominance of men. Figure 2 and Figure 3 show the percentage of the respondents participating in research projects by gender.

Figure 2: Participation in national research projects by gender (%)

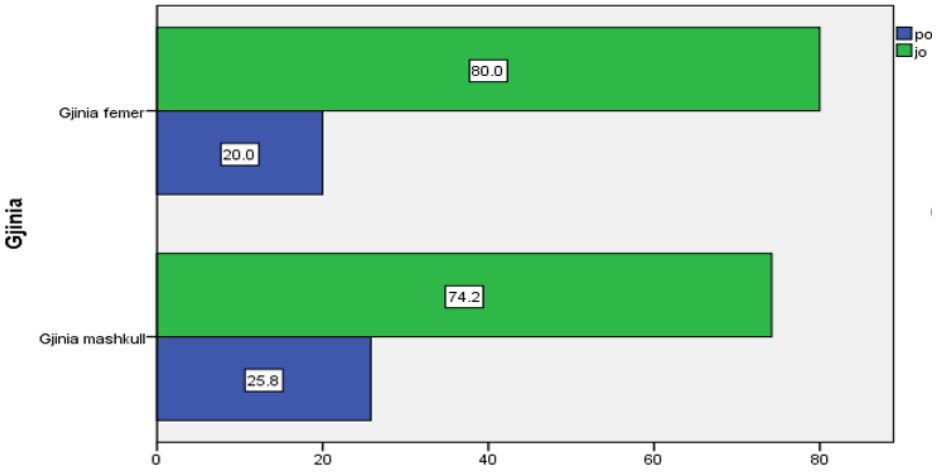
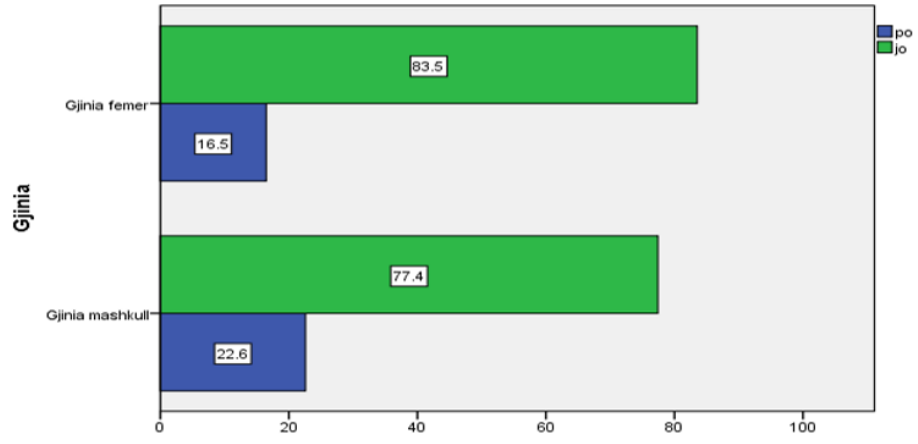


Figure 3: Participation in international research projects by gender (%)



Data introduced in the above figures reveals that 20% of women and 25.8% of men included in the survey have participated in national projects (figure 2). Regarding participation in international research projects data show that 16.5% of women and 22.6% of men included in the survey have participated in EU-funded projects (figure 3). Based on these indicators there is a small difference in favour of men in project participation. It is worth mentioning that when analysing these indicators concerning the ratio of women and men to the total number of academic staff (women represent more than 60% of the academic and administrative UNIKO's staff) and the ratio of women among the total number of respondents (70.3% of the respondents are women) there is no gender balance in project participation. Though women represent 70.3% of the respondents, their percentage in participating in research projects is much lower compared to the % of men.

Staff perception of the institution's commitment to promoting gender balance in career development.

An indicator included in our analysis is related to the perception of the academic and administrative staff regarding the commitment of UNIKO to gender equality. The respondents were asked about the degree of agreement or disagreement with several claims regarding the gender equality policies followed by UNIKO, such as gender-balanced promotion. The results of the survey are introduced in Table 1.

Table 1: Responses regarding some aspects of gender equality policies of UNIKO (%)

	Agree	Strongly Agree
My institution/ department equally promotes women and men	34.5%	39.7%
My institution/department equally cares about the development/qualification of men and women	38.9%	34.5%
My institution/ department equally assesses and distinguishes the contribution of both women and men	29%	29.3%

Leaders demonstrate a visible commitment to gender equality	33%	29.6%
My institution/ department provides an inclusive working environment which supports gender equality	38%	44%

The Chi-Square test of independence was used in each question to check whether there was a statistically significant difference between the observed frequencies in the categories of answers. The p-value (<0.05) shows a significant statistical difference in responses. This means that the indicators are statistically significant and show that the academic and administrative staff of UNIKO perceive the university as an institution which creates and maintains an inclusive and welcoming environment for everyone. Academic or administrative staff have equal rights to apply for any job position that may enhance their personal or career advancement. Women and men have equal chances to develop and advance their scientific careers. There is no structural gender discrimination in career advancement. Although there are no structural obstacles to the advancement of women in academic careers, they remain under-represented in the top position of the academic career pathway. This may lead to further studies of the factors that impact the gender disbalance in career progression, based on an individual or cultural perspective.

Conclusions

Based on the findings of the survey it is concluded that UNIKO acts as a gender-sensitive institution in addressing gender issues and increasing commitment towards promoting the value of equality and inclusion. Women represent 63.1% of the students and academic staff of UNIKO. The study showed that regarding the gender composition along the academic career pathway starting from the position of student, moving through the doctorate to become researcher (lecturer) (C), associate professor (B) and full professor (A), the decrease in women ratio is easily noticed. In the later stages of the career progression, the presence of women is progressively reduced from 63% associate professor to 16.7% Full Professor. The transition from Associate Professor to Full Professor remains the most critical stage for women. An important indicator in the survey, that impacts academic

career progression is related to the gender ratio of participation in national and international research projects. The results showed a gender balance in the ratio of men and women participating in national and international research projects. Although the percentage difference is low, it becomes significant in analysing this result concerning the percentage of women and men in the total academic and administrative staff of UNIKO and the percentage of them in the total number of respondents. A significant indicator resulting from the survey relates to the academic and administrative staff perceptions of UNIKO's gender equality commitment. Most of the respondents perceive the university as an institution that creates and maintains an inclusive and welcoming environment for all; equally promotes women and men; and equally represents the concerns and interests of both women and men.

Since promoting gender balance is essential to provide better working conditions and to conduct scientific research more responsive to societal needs, it is recommended visibility of UNIKO's commitment to gender equality through the promotion of initiatives, incentives and good equality practices. It is also recommended the need for further analysis and studies of the imbalance in career progression, based on an individual and cultural perspective.

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“ETHICS IN THE TECHNOLOGY AGES, THE IMPERATIVE OF RESPONSIBILITY” - BY HANS JONAS

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Abstract

This paper highlights Hans Jonas's ethical philosophy in the technological age. Central to his discourse is the profound idea of responsibility, asserting that technological advancements' remarkable power bestowed upon humanity necessitates an equivalent ethical obligation. Hans Jonas's ethical framework weaves together responsibility, anticipatory ethics, biodiversity, sustainable technological progress, and the Promethean gap into a comprehensive vision for navigating the ethical challenges of the technological age. His insights continue to resonate, urging society to approach technological advancements with a deep sense of responsibility and a commitment to the well-being of the planet and future generations. A key component, anticipatory ethics, advocates for a proactive and cautious stance towards technological progress, emphasising the importance of ethical contemplation before embarking on new technological frontiers.

Jonas expands the ethical scope beyond anthropocentric views, stressing the inherent value of biodiversity and calling for a responsible approach that acknowledges the interconnectedness of all life forms. Sustainable technological progress, a cornerstone of his philosophy, advocates for the integration of ethical considerations into scientific and technological processes, prioritizing the long-term consequences for the planet and future generations. The concept of the Promethean gap, encapsulating the chasm between technological prowess and our ability to control its repercussions, serves as a poignant reminder of Jonas's call for prudence, cautioning against unfettered progress without a comprehensive understanding of potential risks and ethical implications.

Together, these notions form a holistic ethical vision, guiding society to approach technological advancements with a profound sense of responsibility and a steadfast commitment to the well-being of the planet and its rich tapestry of ecosystems.

Keywords: *Imperative of Responsibility, anticipatory ethics, biodiversity, sustainable development, ecosystems, the unpredictability of human technological advancement, bioethics*

"Act so that the effects of your actions are in harmony
with the permanence of genuine human life."
Hans Jonas

On Prometheus's Way to Overcome Death and Choose Life

This work examines ethical philosophy and some questions related to ethical issues raised in the age of technology. Hans Jonas, a German-American philosopher and bioethicist, is known for his work in environmental ethics and the philosophy of technology. In his influential work in contemporary moral philosophy, "The Imperative of Responsibility: In Search of an Ethics for the Technological Age" published in 1979, Jonas explores the ethical implications of modern technology and its impact on human existence, as a response to ethic challenges posed by modern technological developments. (Jonas H. 1979)

At the end half of the 20th century, Jonas's work moves away from traditional ethical frameworks, particularly from Immanuel Kant's categorical imperative, and grapples with the unprecedented power that humanity holds over nature through technology. Heidegger's critique of technology (Heidegger M. 1977), a complex and deeply philosophical critique rooted in his concern for the impact of modern technology on human existence, culture, and the relationships between humanity and the world, inspired Jonas, especially his criticism of technology as an instrumental force challenging human existence.

We will continue to raise questions about technology. We are asking constructs a way. Therefore, I would advise focusing primarily on the manner and not concentrating attention on isolated sentences and themes. The manner is a way of thinking. All ways of thinking, in the manner of perception, particularly lead through language. We will raise questions about technology and must prepare a relationship of freedom towards it. The relationship will be free if it opens our human existence to the essence of technology (Heidegger M. 1977).

While critiquing Heidegger's pessimism, Jonas incorporates Heidegger's insights to develop a more constructive philosophy that acknowledges the double potential of technology for harm and benefit. Jonas's exploration of technology as an ethical subject provides a comprehensive and provocative framework for navigating the moral challenges of technological advancement. His emphasis on the ethics of responsibility, the unpredictability of technological outcomes, the biophysical foundation of ethics, and the principle of responsibility contribute to a holistic approach to thinking about the future.

As we grapple with the implications of rapid technological advancements, Jonas's insights remain crucial, urging us to maintain an ethical stance that prioritises responsibility, ecological awareness, and the well-being of current and future generations.

At the core of his discourse is the broad idea of responsibility, asserting that the extraordinary power given to humanity by technological progress requires an equivalent ethical obligation. Jonas's ethical framework combines responsibility, predictive ethics, biodiversity, sustainable technological development, and the Promethean gap into a comprehensive vision for navigating the ethical challenges of the technological age.

His thoughts continue to resonate today, urging human society to approach technological development with a deep sense of responsibility and commitment to the well-being of the planet and future generations.

In his view, a key component constitutes predictive ethics, whereby a proactive and careful approach to technological progress should be maintained, emphasising the importance of ethical reflection before embarking on journeys within the new technological frontiers.

Jonas expands the ethical scope beyond anthropocentric views, emphasising the crucial value of biodiversity and calling for a responsible approach that acknowledges the interaction of all forms of life.

Sustainable technological progress, a cornerstone of his philosophy, supports the integration of ethical considerations into scientific and technological processes, prioritizing long-term consequences for the planet and future generations.

Taking responsibility, for Jonas, means fulfilling the human capacity for thought and ethics. The human capacity to be "who one is" is

achieved not only through language and reasoning but extends to ethical actions of responsibility in the world.
Thus, Jonas emphasizes the necessity of deep thinking, together with others, about existence, human technology, and nature and its evolutionary and ecological processes, before acting in the world.
For our generation, living in times when the exploitation of nature, the voracious use of natural resources, the mining operations for mineral extraction, large-scale fishing operations, uncontrolled carbon dioxide emissions, and global consumption practices, driven by rapid economic growth under the guise of capitalism and market dominance, have resulted in massive environmental destruction. In this analysis, I will not address the threats arising from the work of hydroelectric power plants and nuclear energy, but even though I will not focus on these elements, the threat of mass extinction remains real for humanity and other species.
What is the fundamental responsibility of humans towards our planet, the conservation of nature, respect for biodiversity, and the ethical issues that arise from this?
How do local social values interact with global powers regarding environmental issues to address the environmental threat to humanity's future? What is required of science, society, and morality in times of environmental crisis and threats from climate change?
Inspired by the Enlightenment philosophers who brought faith in human reasoning through rationalism, science, and the growth of industrial economic theories enabled by technological development, humanity fell into the trap of the so-called human right to use natural resources for unlimited benefits and economic development.
Perceiving itself as a dominant species, regardless of the destructive consequences for the less favoured, humanity now finds itself facing the only way to exist, through a new ecological perspective. Ethical responsibility includes non-human entities and the environment, emphasizing an ecological perspective that highlights the intrinsic value of biodiversity and the need to maintain the delicate balance of ecosystems.
We live in a time when the melting of icebergs poses a real threat. Researchers at the University of Leeds have discovered the dramatic impact of climate change on Greenland's iconic ice sheet. Over the past three decades, approximately 28,489 square kilometres, equivalent to

the size of Albania, have melted, leaving behind rugged rocks, boulders, and shrub-covered areas. (Bello A, 2024). Sustainability is a key criterion for responsible technological progress, ensuring the well-being of the planet and future generations. I also wish to bring forth an example of the Earth's Sustainability Index, an alarm bell for the level of consumption that we as global citizens have embraced without being aware that it is precisely we who, with our greed for everything and now, are depleting natural resources that are not infinite. In 1970, Canadian ecologist William Rees introduced the concept of the "ecological footprint," a method to measure human demand for products related to ecosystems and biomass. This method quantifies the demand for resources and supply in terms of the necessary natural area to support these needs. Using a zone as a measure of natural capital supporting life was chosen to highlight that many basic ecosystem services and ecological resources are directed from areas where photosynthesis occurs, demonstrating how humanity is constrained by nature's capacity to transform low-quality solar energy into high-quality chemical energy and living matter.

In 1990, inspired by Rees's work and his ecological footprint concept, Swiss regional planner Mathis Wackernagel and American biologist Susan Burns founded the International Footprint Network, dedicated to promoting the concept of the ecological footprint. Thanks to their research, it was possible to calculate in 2006 that Earth Overshoot Day, the date when humanity's demand for ecological resources and services exceeds what Earth can regenerate in that year, was December 19, marking the first time the scale of the planet's natural resource consumption was highlighted. In less than four years, by 2010, this date was recalculated to be August 21, reflecting a significant increase in the level of global resource consumption. In 2017, the date fell on July 29, indicating the increase in the ecological deficit, and by 2019, global calculations touched July 25. During the year 2020 and the COVID-19 pandemic, the date underwent a recalculation a few days later, offering a correlation on how the reduction in human activity could delay the date of Earth Overshoot Day.

Why is it important to think about the unsustainable way we are using our planet's resources? Let's pause for a moment and reflect on our responsibility to future generations and those who have not yet been born.

I am a mother; I have a daughter. I wake up terrified of the future with the ice melting, the rising oceans, disappearing lands on one side, and the burning forests, dried-up rivers, and desertification on the other. Death as an image of extinction combined with the science of loss of life must be reconsidered as a new concept of social change, through sustainable development and the lenses of bioethics for a real future for all.

At this point, the key element in Jonas's ethical framework, with the notion of the "Promethean gap," becomes so real. This term refers to the mythical figure Prometheus, who stole fire from the gods to empower humanity. The gap refers to the disparity between the increasing technological power of humanity and its ability to predict and control the consequences of this power. Unlike Prometheus, who faced divine punishment, humans must confront the unintended consequences of their technological advancements. The Earth does not have sufficient resources, and by relying on the myth of Prometheus to illuminate the ethical challenges arising from humanity's unprecedented control over the natural world, we have a glimmer of hope to rekindle the light of the future. Using this concept, Jonas presents the need for ethical reflection. Through the Imperative of Responsibility, he seeks to bridge this gap by promoting a reflective and responsible approach to technological progress. Decision-makers must engage in ethical reflection before advancing technologies, emphasizing a proactive and anticipatory mindset, highlighting that ethical reflection must be an integral aspect of decision-making during the development and use of new technologies.

Technology as the subject of ethical considerations stems from the simple fact that technology is a manifestation of human power, meaning action and all human actions are subject to moral scrutiny. It is also true that the same power can be for good or ill, and by using it, humans can adhere to ethical norms or violate them. (Jonas H. 1979) Technology, as a human power, clearly falls under this general truth. But does it constitute a special case that requires an effort of ethical thinking, different from that which accompanies any human action and has been sufficient for all its kinds in the past?

The apocalyptic potential of technology, with its ability to endanger the very existence of the human species, damage its genetic integrity, or modify it arbitrarily, even destroying the conditions of life itself, raises

a metaphysical question that has never before been posed by ethics: should there be, and why should there be humanity? So, why should humanity be preserved as evolution created it, and its genetic heritage respected? If it is a categorical imperative for humanity to exist, then any suicidal gamble with this existence is categorically prohibited, and technological bets, even with peripheral possibilities for such events, must be excluded from their inception.

In summary, Hans Jonas's work on the ethics of technology challenges society to approach technological advancements with a deep sense of responsibility and consideration for far-reaching consequences on the environment, future generations, and the overall well-being of the planet.

His philosophical insights have significantly impacted the field of environmental ethics and continue to be important in discussions surrounding the ethical dimensions of technological progress.

As society grapples with the ethical dimensions of technological advancement, Jonas's insights offer a compelling framework to ensure responsible and sustainable progress that prioritises the well-being of current and future generations.

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DEVELOPING INTERDISCIPLINARYTY IN THE LANGUAGE CLASSROOM THROUGH THE FLIPPED CLASSROOM APPROACH

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Abstract
Interdisciplinarity has become an essential component of modern education, encouraging students to make connections between different subjects and develop transversal skills. However, language teaching sometimes struggles to incorporate this approach due to its traditional structure focused on grammar and vocabulary.
The article proposes the flipped classroom approach as a way to overcome this limitation. In a flipped language course, students receive learning materials, such as videos or written documents, at home, which they study independently. In class, time is dedicated to interactive and collaborative activities that put acquired language skills into practice. This approach promotes interdisciplinarity in several ways:
Integration of interdisciplinary content: Teachers can include material related to other disciplines, such as newspaper articles, documentary videos or discussions on current topics. This allows students to develop their understanding of the world in the target language.
Interdisciplinary collaboration: Students are encouraged to work in teams on projects that combine their language skills with those from other subjects, such as science, literature, or history. This stimulates their creativity and critical thinking.
Acquisition of transversal skills: The flipped classroom approach encourages the development of skills such as problem solving, effective communication and independent research, which are essential in the modern world.
In summary, the article highlights how the flipped classroom approach can be an effective tool for developing interdisciplinarity in language teaching, by integrating interdisciplinary content and activities, promoting collaboration between students and by strengthening transversal skills. This

approach therefore offers new perspectives for enriching the language learning experience.

Keywords: *Interdisciplinary, flipped classroom, French language*

1. Introduction: Curricular Interdisciplinarity and Foreign Languages

In the 19th and early 20th centuries, numerous disciplines emerged, developing almost independently of each other. It was only from the second half of the 20th century that interdisciplinarity gained importance. In reality, individuals have always implicitly practiced forms of interdisciplinarity at different times. Leonardo da Vinci, expert in various fields, represents an eminent example of interdisciplinarity, although in varied registers and with contents of different nature and extent. Thinkers such as Descartes, Pascal, Perroux, Braudel, Von Neumann, Turing, Simon etc. also left interdisciplinary works.

To develop a definition of interdisciplinarity, it may be necessary to first define the concept of discipline. The term "discipline" derives from the word "disciple" and refers to a person who follows and submits to the doctrine of a master. A discipline therefore represents a category of knowledge that can be taught.

This approach involves the interaction of two or more disciplines in the study of a situation or problem. Darbellay offers a precise definition: "*The prefix inter- underlines what is 'between', thus representing the relationship of reciprocity between several disciplines in which we situate ourselves to describe, analyze and understand the complexity of a common object of study [...]"* (Darbellay, cited by Patrick Roy, 2019:10).

Interdisciplinarity goes beyond the simple juxtaposition of school disciplines by promoting collaboration and integration between specific fields around a common objective. According to Thierry Philippot (2013:2), interdisciplinarity is an approach where disciplines must exchange and share their skills in order to create a common project beneficial for the student, rather than being limited to a simple superposition of disciplines.

According to the definition of Lenoir and Sauvé, school interdisciplinarity implies the linking of two or more school disciplines,

at the same time at the curricular, didactic and pedagogical level. This approach leads to the establishment of links of complementarity or cooperation, interpenetration or reciprocal actions between them in various aspects such as the purposes, objects of study, concepts and notions, learning approaches, skills, etc. The objective is to promote the integration of learning processes and knowledge among students (Lenoir and Sauvé, 1998:121).

Thierry Philippot proposes another approach to classifying interdisciplinarity:

- Interdisciplinarity tool: one discipline is used to teach another discipline.
- Project interdisciplinarity: the teacher organizes his lessons around different projects or themes.
- Pretext interdisciplinarity: work in one discipline serves as a pretext for acquiring knowledge in another discipline.
- Conceptual interdisciplinarity: the teacher approaches a concept used in various disciplines.
- Procedural interdisciplinarity: a common procedure is used in different activities from various disciplines.

2. Interdisciplinarity in the Albanian Curriculum Framework

The curriculum is organized into areas of learning that are based on the real separation and integration of areas of knowledge. As such, the curriculum must simultaneously ensure the balance between the knowledge, skills and attitudes of each learning area, as well as the integration within and between them. The degree, depth and form of integration are conditioned by the features of the fields, subjects, topics, etc., necessary to be integrated. This means that integration is a dynamic process that depends on the needs for change in the acquisition of knowledge, skills, etc., as well as on learning situations. (MASH, 2018)

It is based on the principle of subject integration, which reflects the integration of human knowledge, which the implemented curriculum undertakes to develop. In this way, effective teaching cultivates interdisciplinary thinking.

In the Curriculum Framework and in the core curricula of our country, cross-curricular topics are defined, which are: national identity and knowledge of cultures, human rights, moral decision-making,

sustainable development, environment, interdependence and peaceful coexistence. (MASH, 2018)

The subject program "Foreign Language" also promotes interdisciplinary or cross-curricular integration. In addition to providing knowledge, skills and abilities, a foreign language improves student success in all areas of learning. Language skills help the student in the learning process in all subjects of the curriculum. The treatment and learning of language concepts is improved in special contexts of understanding and communication, closely related to the subject matter of the foreign language program and treated in other subjects. The student expands his vocabulary and develops his ability to express himself clearly in all subjects. (IZHA, 2018)

The foreign language enables the student to understand and analyze different texts or messages, influencing the improvement of knowledge in different disciplines. By acquiring language acts and functions, the student develops his ability to communicate correctly and grammatically correct. Also, knowledge of a foreign language facilitates research work in the student's areas of interest, considering that many materials are in a foreign language.

The integration of other subjects in the foreign language helps to enrich the vocabulary and make better use of it. For example, the connection between mathematics and a foreign language is expressed in the teaching of mathematical operations, while biology deals with topics such as anatomy, nutrition and the environment. The connection to art subjects is described in the teaching of sports, music, fashion and visual art. Linking to the Information and Communication Technology (ICT) subject helps the learner to use technology and digital platforms effectively. This connection is given in the diagram below (IZHA, 2018).

3. The Flipped Classroom Approach

The "flipped" classroom was first introduced in the 1990s at Harvard in the United States of America by physics professor Erik Masur (Laudine, 2014, p. 3). He encouraged his students to prepare in advance of the lesson by reading relevant literature and lesson notes, focusing class time on solving the difficulties expressed by students, on in-depth study and on various exercises (Dumont and Berthiaume, 2016 , p. 15).

The terminology "flipped classroom" was introduced around 2007 by two American chemistry teachers, Jonathan Bergmann and Aaron Sams (Dumont and Berthiaume, 2016, p. 15). For them, this method was a way to motivate and make students independent during the learning process by bringing them video lectures to watch outside the classroom (at home) and using classroom time for more interactive activities.

According to Lebrun (2015, p. 73), this form of teaching replaces distance and face-to-face work: the flipped classroom consists of moving the explanation part of a lesson to the home and using classroom time to complete assignments which are traditionally made at home.

Bergmann and Sams (2014) take this idea by stating that the flipped classroom is a form of learning in which students watch video documents at home that explain the theoretical content of a lesson that could have been explained in the classroom and perform in the classroom what traditional pedagogy, it would have been assigned as homework. Flipped teaching is a strategy that enables students to be more active in class,

Active learning requires students to undertake higher-order learning activitie. Taxonomies of higher-order and lower-order learning tasks have been compiled with the most famous known as Bloom's taxonomy (Krathwohl et al., 1964). Rote learning through memory of content alone is considered as lower-order learning whereas integration, application and creation of new knowledge is recognized as higher-order learning.

A study of Melburn's University for STEM students found students did not translate the learning across the different domains once they went into later subjects. Flipped teaching has enabled a more interdisciplinary approach. Using flipped teaching they have developed a hands-on experimental and case-study approach within the longer studio times. As well, all students come together as a group for six-weekly sessions in the theatre. These sessions lie at the heart of our interdisciplinary approach. Because they are no longer focussed on delivering content within the lectures, they are able to run panel discussions with designers, project managers, construction managers and engineers taking students through the process of transforming a design idea into a built reality.

Students begin to understand how professionals collaborate across disciplines. This interdisciplinary approach is challenging for students as it requires them to apply many disparate learning skills and strategies but it also opens opportunities for students to excel in a range of ways. (Clare Newton, Rebecca Cameron and Arturo Ruiz Carillo De Albornoz : 2015)

- **Steps to use the flipped classroom approach to develop transdisciplinary class projects**

1. **Identifying interdisciplinary objectives**:

Determine learning objectives that require a transdisciplinary approach. Identify themes or issues that can be addressed holistically, involving multiple areas of knowledge.

2. **Multimedia content design**:

Create multimedia resources, such as how-to videos, audio documents, or presentations, that introduce core concepts related to transdisciplinary objectives. Make sure content is accessible to students outside of class.

3. **Pre-assign resources**:

Have students review multimedia resources before class. This will allow them to gain a basic understanding of concepts before in-class activities.

4. **Collaborative classroom activities**:

Use class time for collaborative activities that practice concepts covered in the multimedia resources. Encourage collaboration among students and integrate elements from different disciplines into activities.

5. **Integration of disciplines**:

Ensure that classroom activities involve a interdisciplinary approach by integrating elements from multiple knowledge areas. Encourage discussions that explore connections between different topics and disciplines.

6. **Interdisciplinary Assessment**:

Designs assessments that allow students to demonstrate their understanding of concepts across multiple disciplines. This may include projects, presentations or discussions that highlight connections between different knowledge areas.

4. Example of an Interdisciplinary Project Developed According to Objectives and Skills

Subject

Present the eating habits of the class.

Integration of different disciplinary points of view:

Life and Earth Sciences (SVT): This discipline may be involved in the study of biological and physiological aspects of food, such as nutrition, the digestive system, energy needs, etc.

Social sciences: Dietary habits can be studied from a social science perspective, analyzing the cultural, economic, historical and sociological aspects that influence the food choices of individuals and groups.

Health Education: This discipline focuses on promoting healthy eating behaviors, raising awareness of the risks of unhealthy diets, and developing skills in selecting and preparing nutritious foods.

Anthropology: Anthropology can be used to understand dietary habits across different cultures and societies, by examining dietary practices

Consumer Education: This discipline focuses on teaching the skills needed to make informed dietary decisions, such as reading nutrition labels, planning balanced meals, and budgeting for food.

Task	Disciplinary competence (other than language)	Language skills	Lower and higher level skills (Bloom)	Soft skills
1. Design, distribute and analyze a survey questionnaire	**-Computer skills** -to use a computer; -use information search tools (Mozilla, Google etc.); -use software to create the	- Development of oral comprehension through reading different information - Development of written production for carrying	- Search for information to complete questions for the questionnaire -Evaluate the information to use for setting up the survey and presentation	- Work in groups -Organize work and tasks -Manage a team - **M**anagement of time -Ability to adapt to

	questionnaire (e.g. Google Form, Monkey Survey etc.); -share the survey link (email, social networks, WhatsApp etc.);	out the survey - Development of oral production during discussion on the design of questions with peers	-Analyze information to subtract information -Analyze survey data	unforeseen changes -Ability to make decisions - Negotiation skills -Problem-solving skills
2. Present the survey results in the form of a ppt	**Math skills** -To make calculations; -know how to use the concepts of statics, probability, etc. to interpret trends, correlations, and dietary preferences.; **Computer skills** -Use an Excel sheet to carry out calculations	- Development of oral comprehension through reading different information - Development of written production for carrying out the survey - Development of oral production during discussion on the design of questions with peers	- Analyze chart information -Draw conclusions -Search for information on global eating habits, from Albania -Compare the information -Synthesize information -Draw conclusions -Evaluate the results	- Work in groups -Organize work and tasks -Manage a team - **M**anagement of time -Ability to adapt to unforeseen changes -Ability to make decisions - Negotiation skills Problem-solving skills

	-Create graphics -Use presentation software			
3. Present the results orally to the public	**Computer skills** -Know how to use a video projector, -Know how to use a smartboard	- Master oral presentation techniques -Develop oral production when presenting results -Know how to answer question-and-answer sessions	Memorize key facts and concepts related to your presentation. -Identify and understand important information to share. -Explain concepts in a clear and accessible manner. -Summarize and synthesize complex information to make it understandable to the audience. -Use concrete examples or case studies to illustrate your points. -Adapt your speech and information	-Speak in public to present the work -Attract the attention of the public -Show empathy and listening towards the interlocutor

			according to your audience and their level of understanding. -Analyze your audience's reactions and feedback to adjust your presentation accordingly. -Evaluate the effectiveness of your communication based on the objectives of the presentation.	

Conclusion

Interdisciplinarity offers numerous benefits for learning. It ensures a more real, concrete, and global learning experience (Lowe, 2002). By integrating learning and knowledge among learners, it facilitates the creation of links and the transfer of knowledge and skills between disciplines, aligning education more closely with the reality of everyday life (Lenoir and Sauvé, 1998; Lowe, 2002). This approach also appears to result in better overall learning outcomes (Lowe, 2002). Moreover, interdisciplinarity positively impacts students' attitudes, interests, motivation, and relationships. It fosters better attitudes among students and improves the relationship between teachers and students (Lowe, 2002). Additionally, it contributes to the development of better social and cultural interactions, enhancing the overall educational experience (Brunner, 1990; Erickson, 1996; Richards, 1996; Vygotsky, 1978). Therefore, the interdisciplinary approach is highly beneficial for both learning and the broader educational environment.

In conclusion, the article aims to demonstrate how the flipped classroom approach can foster interdisciplinarity in the language classroom. Traditionally, language teaching has focused heavily on grammar and vocabulary, often neglecting the broader, interdisciplinary connections that can enhance learning. By flipping the classroom, students engage with learning materials at home and participate in interactive, collaborative activities in class. This method allows for the integration of interdisciplinary content, encouraging students to draw connections between language learning and other subjects, such as science, literature, and history.

The flipped classroom approach also promotes interdisciplinary collaboration among students. Working on projects that combine language skills with other disciplines stimulates creativity and critical thinking. Additionally, it aids in the development of transversal skills such as problem-solving, effective communication, and independent research, which are crucial in the modern world.

Overall, this approach enriches the language learning experience by integrating interdisciplinary content and activities, fostering collaboration, and strengthening essential skills. It provides a comprehensive educational framework that not only enhances language proficiency but also prepares students to navigate and contribute to an interconnected world.

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PHILOSOPHICAL KNOWLEDGE IN THE ELEMENTARY SCHOOL CURRICULUM

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Abstract
Philosophical knowledge, other than being an activity of mindful skills, contributes in the creation of the active civilian of the future. Our heritage of philosophical education leaves much to be desired, and in addition, it is necessary to approach the global parameters in the fields of education and development.
Elementary education is the challenge and the basis of the philosophical formation of children. In order to lead a based and effective study of this situation it is necessary that the focus extend on the curriculum of philosophical education in elementary schools (even in preschools), on the texts available and the space dedicated to philosophical discussions in textbooks of other subjects, on the space created by teachers to do philosophy in elementary classrooms and even on the insertion of philosophy as a proper subject in elementary education.
Aiming towards a level of teaching according to philosophical approaches in all subjects, the intent of this paper is directed at the theoretical treatment of the elementary education curriculum, the subject (no longer a separate entity), the texts, the programs, the environment, the questions, the teachers and their role; then moving on to concrete situations and observations of elementary classes, even of preschool classes.

Keywords: *elementary education, curriculum, philosophy for children, education process, observational case.*

Overview of School Curriculum Focused on Philosophy

Whether it will only be called a courageous step or it's truly necessary and possible to do philosophy for children in their early life, is a matter that requires thorough treatment based on practical and theoretical arguments.
It is necessary to focus on certain directions of this situation for its study to be as efficient and as concrete as possible:

- The elementary school (even pre-school) curriculum focused on philosophical education;
- The texts and the space they reserve for the philosophical treatment of other subjects;
- The space created by teachers to implement philosophy for children with elementary students.

The philosophical education in our country's conditions is related to two major aspects:

1. Our heritage regarding philosophical education leaves much to be desired. Our behavior, as well as civic and political culture suffice to demonstrate this.
2. It is of utmost necessity to approach global parameters in the field of education and development. Human resources are there, but they're unprepared for the challenges of our time.

These are the reasons that give philosophical education in the teaching process considerable importance.

It is understandable that what should follow are:

- Curriculum changes;
- Qualification of the teachers, not only those of the subjects relating to civic education and philosophy, but also those of other subjects who can implement the methods offered by philosophical knowledge;
- The exchange of experiences and reflections between different levels of pre-university education.

These recommendations (hailing from UNESCO since 1998) should be given importance as "…teaching philosophy plays an entirely special role, gaining such weight that it interferes in the moment that the individual faces the choices that will structure their adult and civic life."[5]

Philosophical education isn't merely the subject of philosophy, but the approach that all other subjects have towards this education.

[5] Annexe de l' arrete deprogramme de philosophie des classes terminals des series generales(1/ VI/ 2001).

In order to achieve this we need to reform the school curriculum in its entirety, as well as to find concrete ways to ensure a level of teaching according to philosophical approaches in all subjects.

Overview of the Elementary Education Curriculum

Elementary education is the challenge and at the same time the foundation of the children's philosophical formation, because this level manages to surpass the deficiencies caused by their critically low involvement in pre-school education.
When speaking of philosophical education in elementary schools, we don't assume a separate curriculum for one single subject which offers the philosophical knowledge to the child. In this level of education children need a philosophical education that goes beyond the curriculum of one subject.

Doing philosophy with children means creating methodical philosophical exercises in classes despite the specific subjects. There should be opportunities for them to fulfill not only the objectives aiming on their personal development, but also their self-consciousness through philosophical exercises.

Other than being an activity that refines the mind, the philosophical discourse contributes in the creation of the self in the child, of the active citizen of the future. UNESCO has conducted analyses and has given perspectives of philosophy through the models and experiences of schools around the world, leaving them as options for all those countries, ours included, where the conceptualizations, institutionalizations and services of children's philosophy as part of curriculums and education haven't been reached yet.
Children's philosophical education in the elementary schools would require an evaluation of the education process as a whole in certain fields:

- Thinking for oneself and the importance of identity;
- The learning of civic education and thinking;
- The aid in the personal development of the child;

- The improvement of language use, specifically in communication and debating skills;
- The involvement of children in the critical, creative and reflective thinking;
- The enrichment of didactic methods in the classroom.

The Subject. The Text. The Program

Perhaps not entirely, but majorly, it has been accepted that all of the above may be fulfilled by the subjects of Civic Education, namely "Edukatë Qytetare" or "Qytetari" in Albania's school system. Undoubtedly, Civic Education is a definite and official part of the elementary education curriculum, with a positive influence on children's philosophical formation but there are also undeniable problems that derive from this.

Civic education turns into a manual that pupils use in the "suburbs" of learning. The way the curriculum is built drives them to learn their lessons by heart and giving answers as they are phrased in the texts of the subject, which pushes pupils further away from trying to form their own, reflective and critical thinking.

We shouldn't overlook another matter, as technical as it is didactic and pedagogical: the matter of teachers who lack the necessary philosophical formation or their preparation in the fields of social sciences.

How does philosophical integration present itself in other subjects?

Children often try to remember an answer by heart, the answer that the teacher requires to be cited as it is written in the text. When they don't really understand what they are learning by heart, the teacher need only change the question a bit for the pupils to find themselves in front of an unexpected situation that presents difficulty for them. The texts are often organized in such a way that they don't leave space for children to speak their own minds.

Many teachers try to change the routine practices or those indicated by the texts, so that they can support the development of critical and reflective thinking in their classrooms. They want their pupils not to repeat, but to doubt, investigate, create, solve, interpret and argument the facts, data or ideas presented to them. They find ways to make their

pupils think on what they learn, in order to use it as a foundation for further learning and rationalizing.

Years ago, the Swiss psychologist Jean Piaget demonstrated that the individual learns by understanding the surrounding world through existing concepts. Throughout this process of understanding the world, the old concepts change and our abilities to understand more in the future expand and grow.[6] For example, before pupils start to understand their lessons on the Illyrians they should have some knowledge on geography, the importance of commerce, etc. After their lesson they should have a fuller understanding of the above. Now the concepts have expanded, and they facilitate the research into these topics.

Piaget's views were further expanded by Neisser, Pearson and Anderson by creating links to the teaching process. Being that the pupils learn through utilizing their existing knowledge, although some of their concepts might be incomplete or wrong, the teachers should start the lesson by evidencing the pupils' existing concepts and preparing them through asking questions and laying out the objectives of learning. The pupils learn through understanding things, through exploring and asking, and teachers should prompt them to ask questions. Referring to the fact that asking questions is an activity that can be refined, the teacher should show the pupils how to research, ask, doubt and build arguments.

Lastly, since learning changes the old ideas and expands the capacity to get to know new things, teachers are the ones that will push their pupils to reflect on what they've learned, to examine the consequences and change the focus towards adapting the old way of thinking with the newly acquired one.

It is known that the most successful classes are the ones that prompt pupils to think on their own and get involved in critical thinking (Halpern, 1996; Kurland, 1995; Unrau, 1997). Through critical thinking we can examine our own ways of making decisions and solving problems. When thinking critically, the attention is always paid to what is being thought and how it is being thought. The pupils that manage critical thinking become better adept at facing challenges and see them as chances to learn even in difficult circumstances. They pay attention to the opportunities to utilize their critical and reflective thinking and then put them to use not only inside the classroom, but

[6] *Strategji të mësimdhënies dhe të të nxënit për klasat mendimtare*, Tiranë, 2006.

also outside it and beyond, in life. The discussions between pupils or between pupils and teachers happen often and there is understanding and liveliness to them.

The Questions

Often discussions may arise prompted by the question of a pupil or of the teacher. The order, the type and the structure of the question play an important role in continuing discussions. Obviously it is just as important to memorize the facts, but in order to use those facts to solve problems and make decisions, the questions should be oriented towards the critical, creative and reflective thinking.

For example, we should move beyond the question of whether it was right for our people to fight for freedom and independence from the conquerors; instead it would be far better to discuss and debate on the issue: Is war always a wrong thing?

Also, it would give more results if instead of asking "What is the temperature in which water freezes on the sea level", the teacher asked to discuss "Why in winter the waters close to bridges and cities freeze later than the waters of the lakes in villages".

Such questions might have more than one possible and valid answer. They attempt to reflect a higher thinking level that reaches beyond the simple repetition of facts. The contents of the questions are as important as the way in which they are structured. There are many strategies that teachers use, can use or should use in order to offer their pupils the chance to do reflective, critical and creative thinking (Gibbs 2001):

- Asking questions that have more than one possible answer.
- Giving the pupils time to think so that as many pupils as possible can give their own opinions.
- Asking follow-up questions, such as: "What do you think?"; "What can you add to that?"; etc.
- The opinions of the teacher should be structured in such a way that they neither affirm nor negate what the children say. This way, the discussion remains open and the debate is respected.

- Asking children to summarize their friend's thought, thus imparting on them the role of the synthesizer.[7]
- Asking, from time to time, for the opinion of other children on the same issue.
- Prompting the children to ask questions to other children.
- Sometimes the teacher must become "the devil's advocate", starting the discussion from the opposite, from the doubt.[8]
- Pushing pupils to think out loud.
- Not putting in difficulty the pupils who can't give an answer. In this case, the teacher should swiftly go to another pupil.
- Exposing other possible answers.
- Prompting children to change their views from time to time.
- Pushing them to imagine.
- Encouraging them to establish links to similar situations or issues.
- Transforming the questions and combining them in such a way that the pupils complete brain operations that require deeper analyses.

The Environment

Above we talked about the questions and their perfection through clear didactic, pedagogical and philosophical objectives. When speaking about the elementary education curriculum, we keep in mind the program, the subject, the text, the method, the strategies the teacher uses, etc. Obviously we cannot list every single aspect so that we can leave this matter open for further future treatments. What we should underline, though, is that everything we lay out and discuss in this paper is a reflection that derives after a process of observing either one full class or parts of a class, and surveying pupils and teachers. The scope here isn't to highlight the shortcomings, but rather the issues and problems pertaining to this issue; furthermore, when it comes to this topic of philosophical integration it's not necessary to discuss what has been done well and what not, and the focus should instead be directed

[7] The synthesizer, the animator, the reformator, the president of the séance, the micor student, are all actors of a "philosophical atelier" (Alain Delsol).

[8] This method may be used in comparison to the "method of prior thinking" by Jacques Levin.

at what should be, how and where it should be, as well as at the recommendations, ideas and further discussions to build the plan for the rest of the wroks that we should undertake.
In the same viewpoint we shall follow the environment and its link to the processes of rationalizing and the prompting of critical, reflective and creative thinking.

- The atmosphere in the classroom should be the responsibility of both teachers and pupils. Activities can be suggested by teachers but also by the pupils.
- Teachers should demonstrate to their pupils their way of thinking and help them talk about the strategies of thinking. Teachers should demonstrate the way that critical thinking can be accomplished by treating all of their ideas hypothetically and in a way that stimulates respect for differing opinions. With this method the pupils will better understand not only each other's ideas, but also each other's ways of thinking.
- The classroom should be an environment that promotes openness and research. The pupils must play specific roles when they practice different ways of thinking, when they predict, when they collect and process information and when they raise questions and doubts regarding their conclusions.
- Pupils should be supported, but to a degree. Teachers should pay attention not only to what they are teaching children, but also to the way in which they are teaching them, the way in which they are thinking and delving into research processes. Teachers should instruct pupils while respecting them as individuals. The environment should be warm and safe. Thus the pupils will be lead to a path of success.
- The classroom should have such an organization that pupils can work and communicate easily with each other. If we want to make children understand how important and valuable their words and minds are, then the classroom should offer enough space to accommodate the opportunity for everyone to talk to and work with each other.

The Teacher's Role[9]

The teacher's role becomes more complex. There is a remaking of this role in correlation to knowledge. The image of the teacher is not that of someone who has a degree of competence based on their knowledge, but that of someone that is open to accepting the mysteries of existence, the meaning of life, death, and love. The teacher relays the responsibilities on to the pupils and assigns their roles in a discussion. The questioning culture and a non-dogmatic correlation between knowledge and philosophical teaching becomes concrete when the teacher does not present their own opinion in front of their pupils. Obviously, if the teacher gives away the answer, the pupils will cease their search for it. If the teacher imposes a thought, the pupil will start looking for the answer that the teacher wants.

Following the recording in two different classes, it is noticeable that, sometimes more and sometimes less, the teacher tries to work with the reflective thought of each pupil. The teacher has a variety of roles which sometimes change, thus implying occasional opposing views: they oscillate from the philosophical atelier of A. Pautard in the first minutes (being present, but not involved) and the "programmed disappearance" of the speaker, presented by J. F. Chazerans until they reach the exposure of the truth defined by O. Brenifier, then following with a strong discussion where the teacher assumes the role of a third actor between the discussing groups of pupils according to the model of "philosophical interviews in groups" presented by Lalane, directing the collective progress by distributing the roles in a democratic manner but without offering solutions and finally reaching the metacognitive phases of the debate which A. Delsol and S. Connac have spoken about. It is important to understand that when the teacher takes a step back and allows the pupil to enter the thinking process alone or with the teacher's careful direction, that's when the pupil is pushed to undertake philosophical actions.

So it is made abundantly clear by what we have said above that we can consider an analysis of the curriculum (with the objective of the philosophical approach in the elementary education) by following the line: program-subject-text-method-strategy until we reach the very important actor and factor that will factuate this objective: ***the teacher***.

[9] In everything mentioned above, the unreplaceable role of the teacher is highlighted.

Philosophy in Kindergarten

It is rare to be in the company of a child and not be bombarded with a series of questions that re almost never asked in the right moment, when the parents are stressed and tired after a long day of work, or in the morning when they're driving their children to school in the middle of the terrible traffic. *"Why do people die?"; "Where was I before I was born?"; "Why do people have heads?"* etc. These are the evidences of a metaphysical dialogue with children. All parents must face this difficult exercise with their children, who start asking these types of questions from the age of 3 and culminate at the age of 6. This is the age of questions, of infinite why-s in their heads. One question after the other, but apparently none of the answers they get from the adults is quite convincing to them.

The new generation of philosophers is growing up now. At least, that's what is being said by many experts who research into children's problems and who are convinced that it is important to teach them since elementary school, even since pre-school, the art of reasoning and of reflecting on the world, an art that has its origin in ancient Greece. The most famous case is that of a classroom in a small Parisian neighborhood, in *Mee-sur-Seine*, where a teacher decided to transform the questions into a philosophical work for the children. Every 15 days, Pascaline Dogliani would write abstract words on the blackboard, such as justice, freedom, love, death, thus pushing conversations with her pupils. *"It is the opposite of what we do every day. More than giving the answers, we want to stimulate the questions,"* – she says.

Dogliani and her *"Little Platons"* have become protagonists of a documentary. Titled *"Ce n'est qu un debut"* follows the revolutionary experience of this classroom and the results achieved afer two years of applying this program. "Even the most shy ones spoke in length during our discussions, improving siginifcantly in their ways of talking. Philosophy is a way to free creativity," – the teacher says. In fact, philosophy is a discipline that is taught in high schools. Since 1990 UNESCO has recommended that this subject be introduced in kindergartens, based on the method of American professor Matthew Lipman.

In Italy, the desire to learn philosophy in early life has been widely and quickly spread. The Municipality of Modena trains elementary school

teachers and options lectures for children. In France there are philosophical courses when children aren't at school. "Perhaps it's a trend, but I do believe that the phenomenon also reflects the parents' wish. Fathers and mothers today don't really want to tell their kids that 'they'll understand many things when they get older' or 'stop asking, I have no time'," – says the organizers of the courses, Jean-Charles Pettier.

French bookshelves are now full of philosophical manuals aimed at children over the age of 3. One of the most successful authors is Briggitte Labbe, who has published 35 books on her *"philosophical mornings"*, translated in 18 languages. The accompanying CDs and videos allow for the at-home development of debates such as: *"Why am I not the boss?"; "What is the difference between life and death?"; "Male or female?".*

Meanwhile Jean-Paul Mongin has truned the philosophers' biographies into fairytales in his new collection *"Petits Platons"*. Luckily for us, the series has also been translated in Albanian.

Figure 1: Books of the *Petits Platons* series translated in Albanian

Before sleep, parents can read to their little ones about the lives of Socrates, Descartes, Kant or St. Augustine. "For a long time it has been believed that small children who still can't speak fluently cannot understand the rationalizations of a discipline like philosophy. But, starting from the age of 3 and up, they can quickly absorb everything they listen," – says the philosopher Roger - Pol Droit, who is the author

of the manual *Osez parler philo a vos enfants* (*Dare to talk about philosophy to your children*), where he invites parents to excert with their children in this field. "Plato and Aristoteles said that you become a philosopher when you are in awe and ask about thing, and this is precisely what children do today around the ages of four to seven," – Droit continues.

According to experts, it is of great importance to benefit from this stage in order to build the way of thinking for the future. "All children are born philosophers," he concludes, "but only a few of them truly become that."

"It's not bad to teach children elements of philosophy. This makes them use their brains in critical ways," – says Poggi. This is what he advises to a philosopher that wants to talk to children: Do not be the teacher of only doubts and uncertainty. Make the children understand how this subject intertwines with the history of humanity's ideas, the development of criticism and reasoning, and even the great scientific discoveries. It is only in this way that the critical sense of young pupils can augment.

Referring to the intention to raise a generation that thinks differently, oriented towards critical thinking, creativity, reflection, reasoning and development, implementing philosophy for children is right.
Referring to the examples, models and concrete results of involving philosophy with children in our classrooms and in the conditions where the teachers don't have any specific training in this direction other than their zeal and commitment and perhaps some casual information regarding the field in question, implementing philosophy for children is a possibility.

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SOCIOLOGY AND PHILOSOPHY'S IMPACT ON THE DEVELOPMENT OF STUDENTS' CRITICAL AND CREATIVE THINKING

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Abstract
The dynamics of the educational system and the teaching process in today's developing society need the construction of a multidisciplinary generation capable of critically thinking and responding to events in real life. Modern pre-university curricula explicitly outline acquiring new knowledge and learning objectives, emphasising the value of critical and creative thinking as a key factor in developing student's abilities. According to this concept, sociology and philosophy are crucial in helping students develop multifaceted skills in all areas of human activity. This essay aims to critically assess the value of philosophy and sociology as the primary subjects for developing students' critical and creative thinking skills so that future generations can think independently, confidently, and responsibly. The paper aims to reevaluate the contribution of philosophy and sociology to the growth of analytical, synthetic, dialectical, reflective, critical, and creative thinking abilities, currently among the process' top goals in education. When sociology and philosophy are included as elective courses in the curriculum, the conversation assumes particular significance. Today's society is developing in a way that makes it necessary to educate people who are morally grounded, creative thinkers, and capable of judging circumstances and issues and applying reasoned solutions. The ability to think critically and creatively has made this feasible.

Keywords: *critical thinking, teaching process, cultivation, sociology, philosophy, curriculum*

Introduction
Today's dynamic reality necessitates a society capable of encompassing all aspects of real culture, as it is a civilisation in perpetual change. One of these demands is considered to be

argumentative and creative, where education aims to support students' diverse ways of thinking while absorbing new knowledge, processing it, or expressing or uniting with other students. Additionally, it demonstrates the value of critical thinking in the classroom and the study of social philosophy and philosophy, where criticism is regarded as a high form of thought at the core of knowledge. Encouraging critical and creative thinking in philosophy and sociology is crucial to teaching progressive standards and improving the quality of instruction in the pre-university curriculum.

When it comes to teaching sociology, sociological knowledge is essential to the development of critical thinking skills. This helps students become more involved in the process of learning about society and provides them with a realistic context in which to recognize the social issues that all members of society face, explore their thought processes, and utilize these issues to further their sociological education. Sociological reasoning is utilized in the training of critical thinking, as well as in the comprehension and contemplation of social realities, phenomena, and processes. Even the teaching of philosophy in schools is unquestionably utilized to apply philosophy as a curriculum and formative subject in the learning of youth. The critical thinking that philosophy fosters is the outcome of a didactic lesson on the subject matter of philosophical concepts on the part of the students, communication skills in problem-solving reflection, and the ability to present a convincing case using premises and objectives to resolve an idea or problem.

Interpretations and Traits Related to Original Thought

Jane Piazhe once said, "The primary purpose of education is to create people who are capable of doing new things, not simply repeating what previous generations have done- people who are creators, inventors, and discoverers." This statement comes to mind when we discuss creative thinking. Developing critical thinking skills and the ability to question authority figures is the second objective of education (Musai B, 2003).

The capacity for alternative generation and multivariate analysis is known as creative thinking (Fisher R, 2013). The integration of critical and creative thinking, according to educational scholars, would result in a logical flow for creatively integrating ideas and resources, where

all knowledge is reorganized and reconceptualized from a fresh perspective. Convergent processes, analytical methods, and inductive thinking are necessary for problem-solving, or critical thinking. Divergent processes, originality, and deductive reasoning are necessary for creative thinking that incorporates intuition and discovery (Orstein, Alan C, 2003). Philosophical thought appears inductive, deductive, and dialectical (indicative and deductive), according to the perspectives of both classical and modern writers (Hersh Zh, 1993). This suggests that critical thinking and creative thinking based on divergent processes may develop in the future. These processes are also prevalent in the field of sociology, as this discipline requires that the actual issues facing society be asked through questions and that answers be found concerning these questions, and vice versa.

Sociology as a Critical Lens through which to View Students' Social Realities

Incorporating critical rational thinking into the social science classroom, particularly in the context of sociology, allows students to participate more actively in the process of learning about society. It also gives them a realistic context in which to recognize social issues in the society they live in and to consider different approaches to problem-solving (Tarifa F, 20214).

In addition to gaining a variety of knowledge in the classroom, students also develop personally through a process known as social construction or social learning (Bandura A, 1977). Students connect through reciprocal effects from social, behavioural, and physical environments. The environmental and social factors that support students' behaviour, such as their effort to learn effectively, also have a strong influence on each other and, when combined, have an impact on students' learning because the behaviour that students model for others enables them to be interested in responding socially to the social situations that are created in society.

“Understanding that "what we become as individuals depends on the nature of our relationships with other people" is made possible by sociological reasoning, which is fundamentally a critical reflection on reality” (Schwalbe M, 2000).

“The "sociological task" impacts the developing analytical and critical thinking skills”.

Every action we take demands dedication and the accomplishment of a certain goal we have set for ourselves. In this fashion, students complete various assignments that require them to integrate concepts, notions, and higher levels of thinking while thinking critically and analytically about a range of societal issues. Equipped with sociological understanding, students should develop the following through sociology:

- The capacity to scrutinise the events, processes, and phenomena of the society they are a part of.
- Encourage students to consider various issues related to the advancement of society in their essays.

Research has demonstrated that the theoretical and practical instruction provided by sociological thinking will have two primary effects on students:

Initially, it will assist students in developing deeper sociological views regarding the most significant advancements in Western societies, particularly those that are thought to serve as models for the "formatting" of Albanian society in many ways.

Second, it will familiarise the students with the intricate realms of ever-evolving phenomena and social dynamics (Dervishi Z, 2015).

Philosophical Contemplation and Critical Thinking

From ancient times, philosophy was supposed to be a contemplative way of thinking about oneself and the universe, reversing the course of the mind toward the earlier kind of thought (mythology). Since philosophical questions are how philosophical thought is created, the most natural method of teaching philosophy to pupils is to take the same road and engage in self-philosophy. According to this viewpoint, philosophical thought always strives for critical and logical thought by way of a circle of problems and a sequence of thoughts that begin with students' everyday experiences and move towards genuine philosophical inquiry. The development of students' critical philosophical thinking begins with the relationship between two key components: active learning (based on reflections), which concurrently poses one of the major learning challenges and knowledge about the central ideas and issues of philosophy (through brief texts from philosophers' writings). Students' ability to exercise judgment and

thought on the texts of the philosophical tradition that makes up philosophy's home is a prerequisite for philosophical learning. However, this does not mean that students should limit their education and philosophical thinking to reading these books. Conversely, students ought to function by drawing contrasts between the source texts, which will lead to a lively reflection and vibrant, highly critical thinking that will continuously stimulate students to reflect critically. Drawing from this didactic approach to philosophical education, it is critical to stress that students should acquire philosophy in a way that integrates their thinking with the actual events and circumstances they encounter. Philosophy instruction, on the other hand, ought to have a distinct role in the overall philosophical development, emphasizing the method of introspection for the examination and defence of various philosophical tenets, as well as the understanding of students' attitudes toward these ideas. Specifically, students' approach to information and philosophical knowledge will facilitate students' logical understanding and clarification and teachers' attitudes toward the quantity and quality of information students receive when interpreting and analyzing philosophy.

The core of philosophical thought "puts" the students' critical thinking skills regarding these philosophical texts on the one hand and the knowledge gained from the text on the other. How the instructor and student approach the conception, reasoning, and acquisition of philosophical knowledge demonstrates the stages involved in learning, comprehending, evaluating, and analyzing philosophical data.

Comprehending didactic philosophy

Philosophical didactics is the art or process of imparting knowledge in a way that is dictated by the logic or order that best fits its nature and results from its uniqueness (Pendavinji, Gj, 2013). According to this concept, there is didactic education, which involves the transmission of defined knowledge. Thus, the requirement for philosophical didactics would suggest that there is established philosophical knowledge. Philosophical conceptualization is how the didactic method of philosophy is accomplished. Through their investigations and studies, didactics have presented two approaches: the concept's metaphorical road, which leads students to the concept's definition and the identification of its abstract components (Pendavinji Gj, 2013).

"Socratic questioning" is a dialectical approach to philosophical learning that focuses on "philosophical questioning" in students as they acquire information and knowledge in philosophy. It is based on the formulation of principled questions that serve as the focal point of an idea that is both universal and reflective. Based on critical thinking, "Socratic questioning" is acknowledged as the most effective teaching method. Socrates used the '*majeutic'* method (Hersh Zh, 1993) as a tool to foster critical thinking and idea testing.

The Sociology and Philosophy Curricula in Schools Today

The pre-university curriculum, which is a top priority in our nation's educational system, covers key modules with distinct priorities for each subject that is developed in pre-university education. However, it is evident that the social science subjects—primarily philosophy and sociology—occupy a peripheral position in this curriculum, where they are listed as electives. Sociology and philosophy play a crucial part in understanding critical and creative thinking in today's society.

The school curriculum places a high value on critical and creative thinking, defining it as a necessary skill. Two major academic fields that foster critical and creative thinking are philosophy and sociology. These fields recognize the growing importance of cultivating and possessing critical and creative thinking skills. Rapid qualitative internal innovations in education are required in response to these changes to facilitate the acquisition of new knowledge, skills, and suitable, systematic, and cohesive values and attitudes.

Philosophy and sociology play a crucial role in the dynamics of modern society because they produce people who are morally upright, aware of social norms, able to identify the components of society and how it functions, able to form opinions on specific matters, and able to confront the truth.

Though they currently have a supporting role in the curriculum, the disciplines of philosophy and sociology are crucial because these subjects:

- They have a set number of hours;
- A restricted variety in terms of themes;
- They are elective subjects;

The Need to Incorporate Philosophy and Sociology in School Curricula

These subjects are not areas of knowledge where concepts are learned mechanically; rather, they are learned via a sophisticated process that involves critical thinking, logical analysis of mechanisms and conceptual elements, and the discovery of the truth in an argument. As a result, philosophy and sociology ought to be taught in schools and given top emphasis in the curriculum. As the educated generations of today, students must learn responsibility. They must do this by gaining a philosophical education, applying a sociological approach or perspective, and convincingly engaging in independent thought and analytical reasoning of various elements or concepts. This necessitates a thorough examination of the knowledge gained, the development of lofty concepts, the expression, and particularly the accomplishments of the students upon completion of the philosophy and sociology course, which comprise a range of personal, professional, civic, and life competencies. Because of this, modern philosophy and sociology didactics place a strong emphasis on the combination of descriptive and analytical aspects, based on some essential elements, which allow the proper acquisition of knowledge, the formation of high and critical forms of opinion, as well as the maintenance of a certain attitude on the part of the students about various issues of a social, economic, political, cultural, family, etc.

The curriculum appears to require these two disciplines or studies since they are crucial because:

- Philosophy is first and foremost 'knowledge to learn to live effectively' (Lone J, 2015). Teaching philosophy involves instilling in the students a sense of doubt about everything around them as well as a desire to know the truth.
- Philosophy should help students grasp science and engage in truth-seeking debates so they may become critical thinkers who seek to grasp the substance of things rather than being passive recipients of "every kind of information" that is presented to them.
- Philosophy will assist the learner in producing knowledge, culture, and intelligence through introspection.
- -Sociology equips students with the knowledge and abilities needed to handle life's challenges, work through problems in the real world,

and comprehend their surroundings and society to which they belong.

- You need to be armed with fundamental sociological knowledge to comprehend society, yourself, and the workings of reality. You also need to have a philosophical understanding to comprehend the reality of how this society evolves.

An individual who lacks these two fundamental disciplines in their education will not develop into a moral citizen in a democratic society. Sociology and philosophy are essential components of the school curriculum and the fields they belong to because they provide solid educational frameworks that improve social and familial interactions as well as society. They also have a direct impact on the development and advancement of reasoning, argumentation, problem-solving, and case formulation.

Conclusions

In the educational process, critical and creative thinking are two approaches that demonstrate logical thinking and what qualities lead a student to be critical and innovative in response to various real-world scenarios. This paper aims to highlight the significance of critical thinking in the social sciences of philosophy and sociology, which are currently heavily taught to explore and emphasize the importance of these elements in the educational curriculum. This is because the lesson's goal is to enable the continuous cultivation of critical thinking. Sociology is an essential subject to teach because it fosters critical thinking in students by assisting them in actively participating in the process of learning about society. It also gives them a realistic context in which to recognize social issues in their society and encourages them to investigate different approaches to problem-solving through a sociological education. Apart from imparting sociological knowledge about culture, families, races, ethnicities, and other topics covered in the sociology text, teaching also aims to help students develop social habits through the knowledge they learn in the classroom or society at large, build relationships with others, reflect on real-world situations using the knowledge they have learned about sociology, develop independent thinking skills through practice, and teach them effective problem-solving techniques. As a result, applying sociological reasoning influences the development of critical thinking not just when

applying sociological interpretations but also when comprehending and reflecting on social processes, events, and reality. For philosophy to be used as a curriculum and formative subject in young people's learning, it must even be taught in schools. Philosophy should be encouraged as a subject by providing students with information from critical texts that should spark many ideas for them to consider, including historical currents in philosophy, assessments of one's attitude toward a philosophical issue, and student reflection, which presents some serious problems for the curriculum and the educational system. The contribution that provides the progressive learning of philosophical knowledge and the appropriate one is learning to learn in this philosophical knowledge is what supports the critical thinking that produces philosophy. Philosophy should be encouraged as a subject by providing students with information from critical texts that should spark many ideas for them to consider, including historical currents in philosophy, assessments of one's attitude toward a philosophical issue, and student reflection, which presents some serious problems for the curriculum and the educational system. The contribution that provides the progressive learning of philosophical knowledge and the appropriate one is learning to learn in this philosophical knowledge is what supports the critical thinking that produces philosophy.

Practice guiding students' learning, information processing, and knowledge retention by upholding a rational, analytical mindset that empowers them to establish their own opinions and engage in critical thinking that prompts them to question them.

Examining the significance of social science inclusion in the curriculum has attracted much attention. Studying sociology and philosophy provides students with steady skills of synthesis, analysis, and evaluation before deepening their knowledge through critical and creative thinking. Educational modules or curricula must persuade students of the most effective ways to foster and develop creative thinking in sociology and philosophy courses.

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THE EVALUATION OF THE GERBER METHOD IN THE ANALYSE OF THE FAT MILK PERCENTAGE OF DIFFERENT BREEDS IN KORÇA REGION

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Abstract
Milk is a very rich substrate that offers humans an almost complete nutrition. It is a very wide spread and consumable staple food, as a result of its good taste and high nutritional values. Milk contains water and dry matter, water is the most important component of milk from a quantitative point of view. It constitutes the dispersed phase, in which some substances are found in the form of emulsion, others in the form of colloidal pseudo solutions, others are found in the form of true solutions, etc. The fat percentage can be determined with a quick analysis through the milkometer but also with Gerber's analytical method. The scientific principle behind the Gerber method is that milk fat is separated from proteins by adding sulfuric acid and after the burning of the organic matter is done then you could do the reading of the percentage from 1-16%. In this study were analyzed samples with milk from sheep, from goat and from different breeds of cows from the region of Korçë. At the end of the experiment, the results agree with the theoretical part, which states that sheep's milk is the one with the highest fat content, while among the breeds of cows, the Busha breed stands out with a relatively high fat content of 5% compared to other breeds.

Keywords: *milk, breed, gerber centrifuge, burette, fat, amylacid,sulphuric acid.*

1. Introduction

Milk is a very rich substrate that offers humans an almost complete nutrition. It is a very widespread and consumable staple food, as a result of its good taste and high nutritional values. "Milk as food" is considered to be the production benefited from the normal and full breast milk of animals that enjoy good health and are well nourished. The chemical composition of the milk and consequently the lipids are not in equal amounts throughout the lactation period [1]. They also vary according to the type of food. It varies according to the type of animal, breed and food. Milk fat is mainly composed of triglycerides (97-99%) and in smaller amounts of phospholipids, sterols (cholesterol) and vitamins A, D, E, K. as well as some coloring pigments that give it its characteristic color. From a chemical point of view, this fat is a mixture of glycerides, where unsaturated acids make up a third of all fatty acids, while saturated acids make up 2/3 of the total acids.

Milk fat differs from other natural fats by the high content (up to 8%) of butyric and caproic acids, which are soluble in water. They give the butter its taste, aroma and consistency, while the stickiness comes as a result of the oleic acid. The following factors affect the chemical composition of milk.

Breed and individual characteristics of the animal: The breed of the animal greatly affects the composition and properties of the milk. Especially in terms of its quantity and fat content. There are breeds that give a lot of milk, but with a low fat content, such as the black Holstain, but there are also breeds that give little milk, but with a high fat content as shown in figure 1 [2],[3].

Figure 1. *Silent Holstain cow (left), Jersey or Sukthi cow (right).*

Age of the animal: In general, the amount of cow's milk increases until the fifth or sixth calving. In some cases, age also affects % fat. After 8 births, milk production begins to decrease gradually, because the productive capacity of the organism, especially that of the mammary glands, is limited.

Type of food: When the dairy animal, through food, receives all the necessary substances, mineral salts, proteins, fats, vitamins, carbohydrates, etc. then, milk, which is a physiological fluid produced during the life process, will be rich in such substances and the production will be large.

The mechanical work of the animal: The movements and walks of dairy animals in stable mode are necessary for increasing the production of milk and its fat. Various tests have been done and it has been concluded that daily walks, in good weather of 2-3 km, positively affect the production of animals, milk, fat and vitamin D. This happens because, by moving the body, physiological processes they become more powerful, the blood circulation more vigorous and thus, more nutrients for the production of milk, in the mammary gland [4].

Milking process: Milking, as a process that extracts milk from the animal's udder, also affects the production and composition of milk. In the mechanized or manual milking process, a number of factors are important, such as: number of milkings, method and time of milking, breast massage, complete milking, milking etc. According to recent studies, it appears that 2-3 milkings per day are sufficient. Milking time also affects the quantity and composition of milk.

The animal's health condition: Sick animals produce less milk and more special composition, according to the nature and degree of the disease. For some diseases, milk should not be consumed, in some

other cases, it can be processed after a special boiling. The most common disease in dairy animals is mastitis or breast disease. This disease immediately affects the reduction of fat, lactose, casein and sometimes citric acid in milk.

Temperature and geographic environment: Fat, non-fat dry matter, proteins, minerals, calcium and especially phosphorus generally increase in the winter season. The environmental temperature between 12 and 24 ^{o}C does not bring any change in the milk composition, while the temperature above 30-40 ^{o}C, reduces the amount of milk as well as non-fatty dry matter, total nitrogen and lactose. Fat and lactose experience quite an increase. Some tests done at different geographical altitudes have shown that the geographical altitude above 1500 meters above sea level increases the amount of fat in milk from 0.8-0.9%.

Heat: A number of physical factors, such as temperature, mechanical actions (beating), radiation, etc. affect the change in the composition and properties of milk, after milking. The usual cooling of fresh milk changes its physical state very little. The major changes occur when it is cooled to lower temperatures. In such cases, the specific weight and viscosity increase, and it can even be frozen below 0 ^{o}C.

Mechanical actions: Strong shaking or leaving the milk to stand still for a certain time affects its chemical-physical changes. Thus, for example, when the milk is at rest, its fat beads come to the surface, forming the cream, while when the milk is shaken strongly, the covering layer of the fat beads is destroyed, thus forming a fat mass in the form of butter on the surface.

Irradiation of milk: UV radiation forms provitamin D (ergosterol) into vitamin D. Also, radiation, according to its type, affects the properties and other components of milk. When it is irradiated, it acquires the properties of sterilized milk and an unpleasant smell and taste. This defect can be avoided when the irradiation lasts 8-10 seconds and is done in an atmosphere of carbon CO_2.

2. Materials and Methods

The assessment of milk is done by means of physical, chemical and biological indicators, which are also processed in the standards in force in the Republic of Albania. Below in the table 1 we provide

some standard data for collected milk and for consumed milk. Requirements for milk collected according to STASH 1563-87[5], [6], [7].

1. The milk must be obtained from the whole milking of healthy cattle, be natural, contain no preservatives or additives.
2. Milk should not contain pasture. The milk of treated cattle is collected after stopping the treatment.
3. During milk collection, all veterinary-health rules that are in force must be applied.
4. It is prohibited to mix one type of milk with other types as well as one milking with other milkings.

Table 1: *Analysis of milk composition, per 100 grams.*

Composition	Unit	Cow	Goat	Sheep
Water	g	87.8	88.9	83.0
Proteins	g	3.2	3.1	5.4
Lipids	g	3.9	3.5	6.0
Carbohydrates	g	4.8	4.4	5.1
Energy	Kcal	66	60	95
	KJ	275	253	396
Lactoze	g	4.8	4.4	5.1

Of the volumetric methods, the most used is the GERGER Method, which has been used since 1896. The purpose of this method is this: concentrated sulfuric acid and amyl alcohol separate the rennet from the milk into a compact mass, the volume of which is read on the butyrometer scale [8], [9]. The Gerber method is widely used in all milk processing enterprises in our country and goes through the following stages:

Chemical processing, which is done with sulfuric acid, which separates calcium from casein and casein acid is determined according to this equation:

$$-R-(COOH)_6Ca_3+3H_2SO_4=NH_2R(COOH)_6+3CaSO_4$$

Casein acid does not dissolve in water. For this reason, initially, casein fragments are created in the butyrometer. These react with sulfuric acid and form a complex salt which is soluble in water:

$$NH_2R(COOH)_6+H_2SO_4=H_2SO_4*NH_2R(COOH)_6$$

In this way the lyre was separated from the casein. But in order to separate it from the milk, we continue the chemical processing with amyl alcohol, which acts on the excess of sulfuric acid according to the equation:

$$2C_5H_{11}OH+H_2SO_4=(C_5H_{11})_2SO_4+2H_2O$$

Sulfoisoamyl ether which lowers the viscosity of the mixture thus helping to collect the lye in the form of a layer.

Mechanical processing is done by centrifuging the sample. Lyra differs from the mass of milk in its small density and in its action of centrifugal force.

Heat treatment is done before and after centrifugation. Its purpose is to lower the mass mistletoe in order to help the separation of the rennet from the milk mass [11], [12],[13].

Reagents:

- Butyrometer
- 10 ml pipette for H_2SO_4
- 11 ml pipette for milk
- 1 ml pipette for amyl alcohol
- Water bath
- Gerber centrifuge
- Sulfuric acid with a density of 1.815-1.825
- Amylic alcohol with a density of 0.811-0.815

a) **Butyrometers** are made of glass that withstands high temperatures. The constituent parts of the milk butyrometer are the following: neck. Body, butyrometer scale. The butyrometer scale starts from 0% to 5,6,7,9,10,11 or 12%.

b) **Pipettes** for sulfuric acid and amyl alcohol have the first and second protective bubbles to avoid burning, scalding or poisoning during inhalation.

c) **Bath Water** with a temperature of 60-65°C. For which purpose you can use any container with a height slightly greater than that of the butyrometer, about 27-30 cm.

d) **The Gerber centrifuge** is a mechanism in the form of a horizontal disk with a lid. The capacity of test tubes can be 8, 12, 16, 24, 36 or even more. It must be installed in a completely horizontal position and during the centrifugation of test tubes it must make 1200 rotations/min.

e) **Sulfuric acid** used in the analysis to determine the amount of fat in milk must have a density of 1.825. More concentrated acid will burn and blacken them and the contents of the butyrometer will be almost black and the reading of the result cannot be done accurately. Diluted sulfuric acid will dissolve all protein substances and the fat from the milk will not be separated.

f) **Amyl alcohol** $C_5H_{11}OH$ is a colorless or yellowish liquid with a strong specific smell. Its density is 0.811-0.815g/cm3 and its boiling point is 128-132°C. Amylic alcohol should not contain any small amounts of lyre because otherwise the amount of lyre in the test being analyzed will increase[14], [15].

Sample collection: The experiment begins with the most important moment, the collection of samples which was carried out in cattle stables mainly in the Korçë and Pogradec regions, specifically in the villages of Shtyllë, Dvorn, and Mokër, focusing on breeds such as Tarantese, Holstain, Xhers and some intersections of them as shown in figure 2. We were careful to take the samples from the morning milk to be as fresh as possible so that the fat content is not affected by the changes that the milk itself undergoes over time.

Figure 2: *Real photos of some of the breeds from which the milk was collected. a) Crossbreed Busha + Jersey b) Pure Busha breed c) Holstein breed with black color dominance.*

First, the milk samples are heated to a temperature of 15-21°C and mixed carefully. If lyre grains are observed, the milk is heated to 35°C, mixed carefully and then cooled to 21°C. Then take as many clean and dry butyrometers as the number of milk samples. In the sanded circle of the pear of the butyrometers, the number of the corresponding sample is marked with a pencil. The butyrometers are placed on a wooden stand and start by filling them (10 ml of H_2SO_4, 11 ml of milk and 1 ml of amyl alcohol) as show in figure 3 a) and b).

Figure 3 a), b): *Filling the butyrometers with milk, adding acid (a), adding alcohol (b)*

Then the butyrometer is closed with a rubber stopper acting in this way: with the palm of the left hand grasp the brain of the butyrometer, with the thumb and with that forefinger firmly hold its neck, as with the right hand insert the rubber stopper by rotating it with force until it meets or is slightly submerged in the amyl alcohol as shown in figure 4 a) and b). If the neck is wet, the cap does not fit well and there is a risk that during centrifugation and heating in the water bath, the caps will come off and the contents of the butyrometer will spill[16], [17].
The fully filled butyrometer is attached to the scale part and, making quick movements up and down, the reagents are mixed with the milk. This mixing continues until the last visible drop of milkiness disappears. The butyrometers are turned several times with the neck down so that the acid that remained in the graduated part as a result of the development of chemical processes .The temperature should reach up to 80ºC therefore the butyrometer should be caught with a napkin.

Figure 4 a), b): *Images of the process of burning chemical components of milk except fat*

Then the butyrometers with the cork from the bottom are completely immersed in a water bath with a temperature of 60-65°C for 5 min as shown in figure 5. At this temperature, the fat separates on the surface of the butyrometer.

Figure 5: *Placement of butyrometers in the centrifuge*

Centrifugation is done with the Gerber centrifuge at 800-1200 rpm. Centrifugal force pushes all the heavy parts inside the body of the butyrometer, while the mass of lyre, as a constituent part of the milk with the smallest density, goes around the axis of the centrifuge, that is, it accumulates in the scaled part of the butyrometer. Centrifugation lasts 4-5 min.

The butyrometers are again immersed in a water bath with a temperature of 60-65°C for 3-4 min, then the volume occupied by the oil is read on the scaled part of them.In order to improve the reading, the lower meniscus of the butter should match the divisions of the butyrmoeter by moving the stopper of thisfat as shown in figure 6.

Figure 6 a), b): *Fat percentage reading after centrifugation (a), close-up image (b)*

In addition to the Gerber method, we also carried out some additional physico-chemical analyzes of the samples using the milkometer as shown in figure 7, which gives us information on the percentage content of proteins, lactose, sugars, salts, added water, density and also milk fat shown in the photos successor.

Figura 4: *The use of milkometer for the analysis*

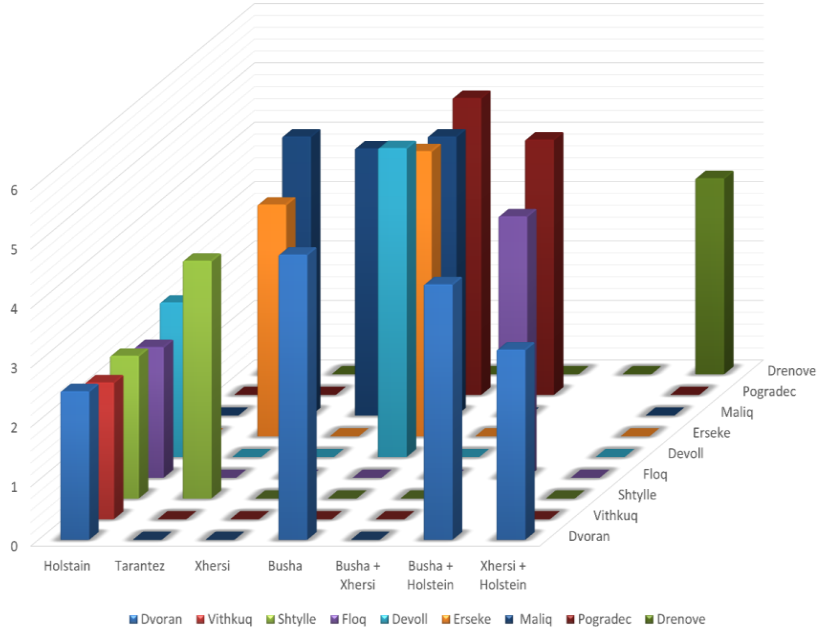
3. Results and Discussions

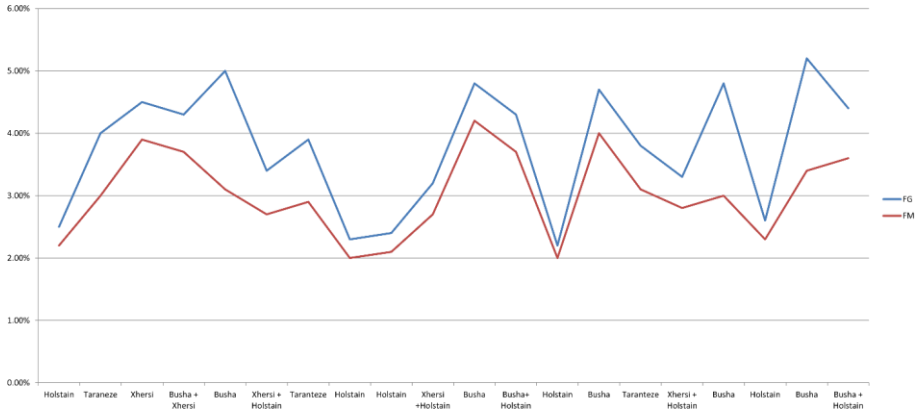
At the end of this experimental work, analysis with a milkometer and the Gerber method, we managed to get the results od 20 samples from different breeds which are best shown in the table 2 below which gives us information about the fat content measured by Gerber method (F_G) and fat content measured my milkometer (F_M). The work was successfully carried out, the fat managed to separate in all the milk samples and was easily readable on the graduated part of the butyrometer.

Table 2: *Results of fat percentages measured according to the Gerber method and with the Milkometer.*

Raca	Holst-ain	Taran-teze	Xhersi	Busha + Xhersi	Busha	Xhersi + Holstain	Taran-teze	Holst-ain	Hols-tain	Xhersi + Holstain	Busha	Busha + Holstain	Hols-tain	Busha	Taran-teze	Xhersi + Holstain	Busha	Holstain	Busha	Busha + Holstein
Rajoni	Dvoran	Shtylle	Maliq	Pogradec	Pogradec	Pogradec	Ersekë	Vithkuq	Shtylle	Dvoran	Ersekë	Dvoran	Floq	Maliq	Maliq	Drenove	Dvoran	Devoll	Devoll	Floq
FG %	2.5	4	4.5	4.3	5	3.4	3.9	2.3	2.4	3.2	4.8	4.3	2.2	4.7	3.8	3.3	4.8	2.6	5.2	4.4
FM %	2.2	3	3.9	3.7	3.1	2.7	2.9	2	2.1	2.7	4.2	3.7	2	4	3.1	2.8	3	2.3	3.4	3.6

Graph 1: *Percentages of fat in milk among different breeds of cattle*





Graph 2: *Comparison of the two methods used to measure fat percentage.*

4. Conclusions

The Busha and Jersey breeds produce milk with a higher fat content of 4.2-5.6%. The Holstein breed produces milk with a lower fat content of 2.2-2.6%. The Gerber method provides scientific data with higher reliability than the Milkometer in measuring fat percentage. The milkometer can be used for quick and orienting measurements in factories and industries but not for scientific purposes. The Gerber method cannot be automated and involves a certain risk in handling concentrated sulfuric acid. The handling of the butyrometer also requires practical skills, which has a negative effect on the stability of the method. In the use of the milkometer, there is a need for calibration from time to time and also the need to do 2-3 washes before each measurement to increase the efficiency of the test.

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