COVID-19 PANDEMIC AND DISTANCE LEARNING

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ABSTRACT

The COVID-19 pandemic is for the first time in 2020 in Wuhan Province, China. It later spread to other countries in the world. In early April, the school in 194 countries, from pre-school to higher education, is closed. Approximately 1.5 billion students are affected by this situation, and therefore their status as full-time students have ceased. All countries with the COVID-19 pandemic aimed to provide continuing education without break. Traditional educational techniques are significantly disrupted by social alienation and restriction policies. Many scientists have shared their work on teaching and learning in different ways after the outbreak of COVID-19. There is face-to-face teaching abolished in many schools, colleges, and universities. Our state of Montenegro, following the example other countries in the world, introduced distance learning. The purpose of this research is to: (1) Application of learning and teaching activities with the help of communication technologies in mathematics teaching. (2) Determine the efficiency of distance learning mathematics. (3) Students' reaction and observation before and after the application of distance learning. (4) Support and implementation of recommendations by the Ministry of Education.

Keywords: Distance education system, Mathematics, High school.

INTRODUCTION

The epidemic, which began with the appearance of COVID-19, which is called a new type of coronavirus, in China in December 2019, spread to the whole world in a short time. In the fight against the epidemic, countries have taken measures such as closing borders, restricting travel, postponing public meetings, and introducing curfews, the virus was declared a pandemic by the World Health Organization on March 11, 2020, because it spread very quickly. Countries affected by the spread of the virus are facing an unprecedented health crisis that will long affect their economic and social structures. Information and communication technologies have become the most efficient means of ensuring a new order of life. People and organizations around the world have had to adapt to new ways of working and living. Measures of social distancing and isolation have changed people's habits, while the internet has made it easier to work remotely, E-learning, online collaboration, playing games, video streaming, etc. played an important role in support. Although these changes limit the mobility of people, they have created an unprecedented density of the Internet. All countries with the COVID-19 pandemic aimed to ensure continuing education without interruption. In this process, countries have mainly used existing distance education opportunities supported by different technological infrastructures. The method of implementation, scope, and content of distance education in each country differed according to the student population, teaching capacities, technological infrastructure, and capabilities of the countries. Some of the countries continued to educate their students through tools such as television, radio, and the Internet.

Many problems have been experienced in Montenegro due to the lack of a preparatory phase in the application of distance education and the fact that it is a rapidly evolving process. These problems are: Inadequate infrastructure, insufficient knowledge of distance education applications, problems caused by students and teachers, and lack of equipment such as the internet and tablets/computers necessary to connect students with distance education applications.

Today, distance education systems continue to evolve with new technologies in development (artificial intelligence, augmented reality, etc.). Unlike the distance education system that was planned and designed from the beginning, due to the COVID-19 epidemic, distance education was urgently transferred to compulsory education.

The problems they face and the insufficiently efficient functioning of the process lead to the fact that students cannot achieve achievements at the target level of teaching, which causes deficiencies in students' learning. Lack of learning in a particular subject will lead to failure in that subject as well as negativity. While students who do not have a lack of learning find it easier to learn the following subjects, students who do not have a learning need more time and effort while learning the subject. To raise education to a better level, it is necessary to replace the missing structures in children. In this context, it can be said that the gap in student learning should be taken into account – one of the lessons in which the student learning deficit is considered necessary.

DISTANCE LEARNING

Distance learning or E-learning is a way of using and implementing information technologies, multimedia and the internet for the purpose of improving the quality of learning and acquiring knowledge, access to remote sources of knowledge, and distance cooperation and communication services. The American Distance Learning Association has given a definition of E-learning as a way to achieve knowledge and skills through the provision of information and guidance, using a variety of technologies and other forms of distance learning.

Distance learning is any form of learning and teaching supported by the use of computers and information technology and especially computer networks based on information technology. Such learning can also be defined as the process of transferring skills and knowledge electronically, with the use of appropriate computer applications (dedicated programs) and the internet as a medium for data transmission.

The term distance learning is one of the most used syntaxes in the process of modernizing learning in the world. The transition to E-learning does not mean renouncing and rejecting the existing way of transferring knowledge, but represents the improvement of the existing educational system, that is, its modernization and modernization. Distance learning as a modern way of transferring knowledge and skills

has been present in practice and has been functioning for more than a decade, and there is almost no educational institution in the country and environment that has not implemented it in its educational system.

Since the beginning of mass distance learning encouraged by the appearance of the COVID-19 pandemic, a lot of analyzes and professional papers have been published. In addition, the education system in Montenegro has gone through several phases since the appearance of the virus. The first is that in the beginning, when distance learning began to be applied in all primary, secondary schools, and faculties, Viber groups were formed by class teachers in which, in addition to students, subject teachers were added, so that they could to send students adequate literature and guidance. After a certain period, we switched to Google Classroom applications. Each of the class teachers was obliged to form classrooms by subjects and for their class, and thus create conditions for easier functioning of distance learning.

Google Classroom (www.classroom.google.com) – Is known as one of the E-learning systems used in the educational process. Based on the slogan "Google for Education", the Google developer community aimed to strengthen the interaction between teachers and students by moving the classroom environment to the internet. Google Classroom has been developed for productivity, efficiency, collaboration, quick feedback, resource sharing, and content enrichment in an educational environment. The Google Classroom, which was launched in 2014 and implemented as part of Google Educational Applications, has become one of the technological tools that support face-to-face education in online environments. Although it is a new practice, classroom management is considered to be efficient and has great potential in terms of controlling students in the educational process. Five basic areas included in the Google classroom; sharing resources and materials, organizing homework and announcements, supporting communication and collaboration, classroom management, and usability of the interface and support structure. Active use of the Google Classroom, which is included in educational applications and online educational tools, enables classroom management, effective learning, efficiency, and effectiveness control. A nice message or greeting written by a teacher in a virtual classroom created through Google Classroom can increase students' awareness and make them feel friendly. In this environment, general information can be shared that will explain the content and objectives of the lesson, announcements, and resources that can be used for the lesson.

In addition to the above, a sufficient number of video tutorials with material were made, which were available on state TV channels called learn at home, where several professors from all subjects organized classes that students could follow.

At the same time, seminars were organized for all Montenegrin teachers for Microsoft Teams training, as part of the Office 365 package.

Microsoft Teams – A teamwork application is part of the Office 365 software package developed in 2017 by Microsoft and is a digital workspace based on chat between an unlimited number of participants. As the name suggests, the application is designed to provide users with a multifunctional work environment that can be upgraded with Microsoft Office materials in one place. The work environment is based on the exchange of materials between users who are divided into teams.

The Microsoft Teams platform itself was created to provide users with a quality workspace through a modern design. The vision of the teams environment aims to become the leader of the virtual work organization and take precedence over applications such as Skype and Viber. The application can be installed on Windows, MacOS, and Linux operating systems, as well as Android and Ios Smart environments. Just downloading and installing the Microsoft Teams app is free which makes the app tempting. The Microsoft Teams platform is available in 181 countries in 18 languages, which makes this application unique.

In cooperation with the Ministry of Education of Montenegro, the application Microsoft Teams from the school year 2020/2021 is applied as part of the regular distance education of primary and secondary school students.

METHODS

Research model
This research was conducted on the basis of phenomenology, one of the qualitative research designs. Qualitative research design addresses the way participants understand their experiences and facts. Phenomenology focuses on facts that are conscious but lack in-depth and detailed understanding. In this study, the reasons for learning disabilities were examined students in mathematics classes in the distance education process carried out due to the COVID-19 pandemic and proposals to address these shortcomings.

Aim and tasks of the research
The aim of the research is to determine how distance learning was conducted in the specific circumstances of the COVID-19 pandemic.

The following tasks arise from the set goal:
1. Determine how distance learning was conducted and how successful it was.
2. Identify the main obstacles to distance learning since the advent of COVID-19.
3. Determine the level of activity of teachers and students through platforms for remote work.

Variables in research
The main research variable is the acceptance of modern teaching methods as well as the readiness of teachers to include these methods and actively apply them in the teaching process of distance education. The center of the variable is the environment in which students are in this case in a home environment, while psychological variables are motivation in the conditions in which students are whether they have the will and desire to learn, and the satisfaction achieved.

Hypothesis
The general hypothesis is that the system of E-learning (online learning) in teaching significantly affects the efficiency of the overall situation in which we find ourselves as well as the entire teaching process. The hypotheses of the research are that the model in the process of distance education brings the improvement of students' knowledge, a higher degree of ability, and skills in students as well as increasing the motivation of students in the teaching process compared to the classical approach to teaching.

RESEARCH METHODS

The theoretical method of analysis examines the theoretical knowledge in modern teaching as well as the way in which they adapt to the content and methods of distance learning. The descriptive method was used to collect students' views on innovative distance learning. Experimental application determined the cause-and-effect relationships and the relationship between traditional teaching on the one hand and the result of application to the distance learning system implemented due to the COVID-19 pandemic on the other hand. By applying the comparative method, the results of traditional and distance learning methods were compared.

Data collection tools
A survey consisting of standardized open-ended questions was used as a data collection tool in the study. In the survey created for this study, there were questions aimed at determining the opinion of high school students in the municipality of Rožaje on the reasons for deficiencies in student learning in the distance learning process conducted due to the COVID-19 pandemic based on the opinion of field experts.

Data collection process

Data were collected in the school year 2021–2022. Correspondence technique was used to collect data. In the correspondence technique, data are collected through written communication. Data are collected through student surveys. Questionnaires containing questions were delivered to high school students of 250 respondents.

Data analysis

The analysis of the data obtained by the research was performed by content analysis. Content analysis is based on the principle of collecting similar data within specific concepts and topics and arranging and interpreting them in a way that can be understood. Data analysis refers to the collection of students' views on traditional and innovative distance learning. The questionnaires were completed by the students anonymously where each of the respondents had the opportunity to fill in the questionnaire.

The survey referred to the conduct of distance learning and questions such as: Do you have the necessary conditions for monitoring distance learning, do you have enough knowledge about distance learning, what are the advantages and disadvantages of distance learning, how satisfied are you/on education through the Microsoft Teams platform, and whether you had any knowledge about it.

RESEARCH RESULTS

All respondents, 250 of them, answered 15 questions from the questionnaire. One of the offered answers to five questions could be marked. Nine questions were allowed to mark multiple answers. The last open-ended question left room for comment regarding distance learning. Of the total number of respondents, 175 students or 70% wrote comments.

How satisfied are you with the traditional teaching?

Of the 250 respondents, 195 or 78% believe that they are satisfied with the traditional teaching. About 55 or 22% of them are not satisfied with the traditional way of teaching.
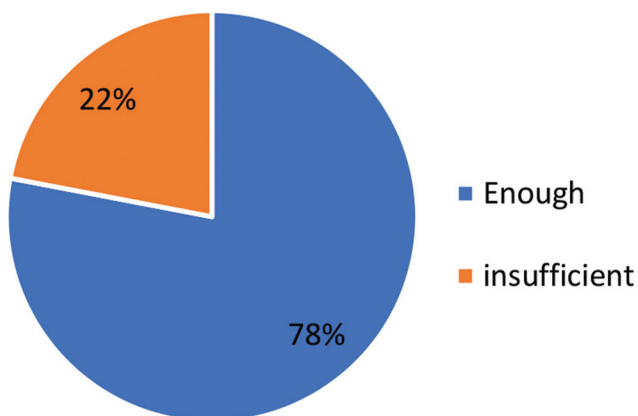

Which communication channel did you use most often during distance learning 1 since the advent of CORANE-19

Most respondents stated that they used MICROSOFT TEAMS – 175 respondents or 70%, Viber (VIBER) used 50 respondents or 20%, Google Classroom was used by 15 respondents or 6%, delivery of printed material five respondents or 2.5%, and five respondents or 2.5% did not used a communication channel during distance learning.

The hypothesis that the most frequently used communication channel was MICROSOFT TEAMS was confirmed, which was primarily the recommendation of the Ministry of Education.

Note: Respondents had the opportunity to mark more than one offered answer that they considered to be the communication tools they most often used in distance learning. One of the reasons is the possibility that some teachers from their subjects used applications more accessible to them than Microsoft Teams. It should be noted that a number of teachers are a little older, so using the application created an additional problem for them, so they tried to forward their accompanying material through the Viber group. While there are a number of students from rural areas who did not have internet and were not able to follow the lessons in that way. For such students, organizing the sending of materials in printed form.
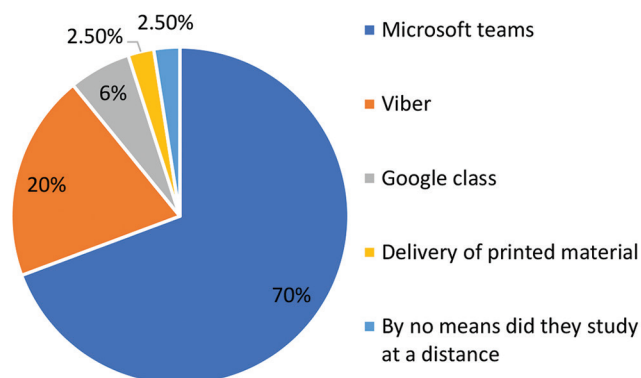
Do you use internet platforms for distance learning on your own?

To this question, 220 respondents or 88% answered in the affirmative, that is, YES, while 30 respondents or 12% answered that they do NOT use internet platforms independently. From this, it can be concluded that the respondents, that is, students possess information literacy to a large extent.
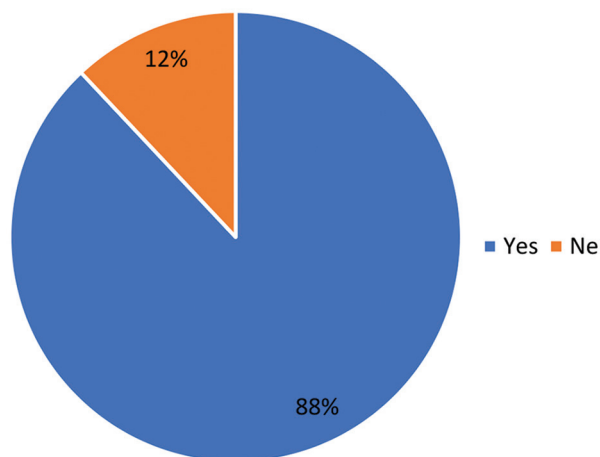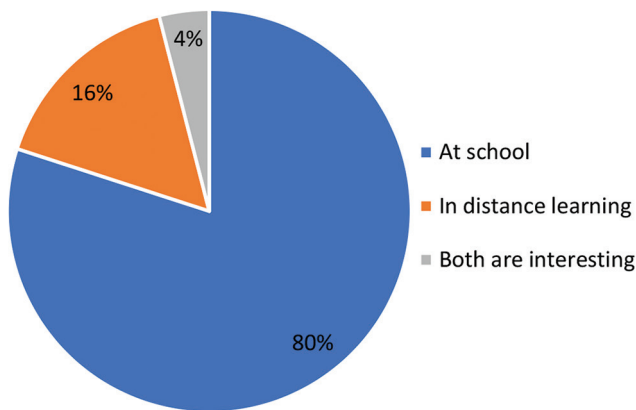

Are the lectures more interesting when you listen to them at school or online (from home) or are they both interesting?
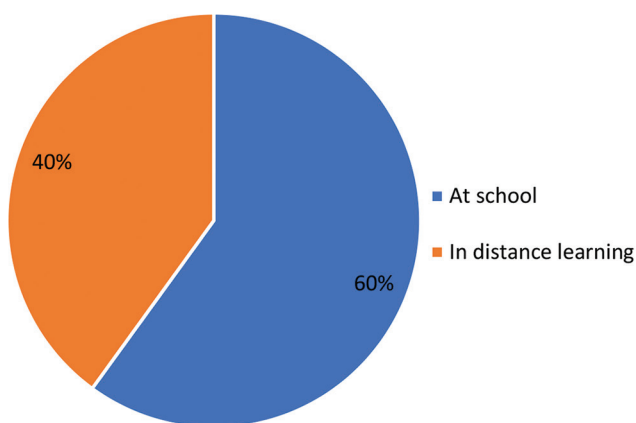
To this question, 200 respondents or 80% answered that lectures are more interesting in school, 40 respondents or 16% that they are more interested in distance learning, 10 respondents or 4% confirmed that lectures are interesting in both environments. These results show that the work of teachers is of the highest quality in regular classes, as well as that it is much more interesting for students in regular classes.

Is it easier to solve knowledge tests, control exercises, in school or in distance learning?

To this question, out of 250 respondents, 150 respondents or 60% answered that it is easier for them to solve control exercises at school,
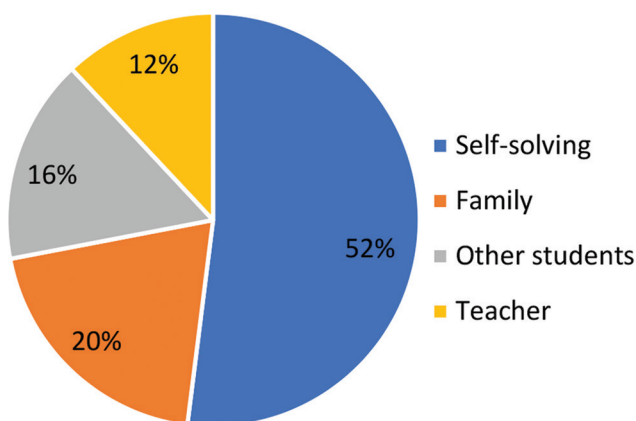
on the internet are more diverse, 50 respondents or 20% answered that the teaching content is more interactive, while 40 respondents or 16% answered that there is multiple access to teaching content.

- Easier access to information
- Various materials on the Internet
- Teaching content more interactive
- Multiple possibility

What do you think are the shortcomings in distance learning?
To this question from 250 respondents, 170 or 68% answered that there is a lack of school, 25 respondents or 10% answered poor internet connection, 30 respondents or 12% answered that they do not understand the teaching content without the support of teachers, 25 respondents or 10% answered responded that they lacked a traditional way of teaching.

- Lack of school
- Internet connection
- They do not understand the teaching content without the support of the teacher
- The traditional way of teaching is missing

Which way of distance learning suits you best?
To this question, 145 respondents or 58% answered that learning platforms suit them the most, 60 respondents or 24% answered the most answered E-mail with instructions, and in a small percentage on television 20 respondents or 8%, while calls over the phone, Viber, or Skype of them 25 respondents or 10%.

We see that learning platforms are most suitable for students, but still E-mail is one of the ways in which students are also used the most.

- Learning platforms
- Mail with instructions and tasks in the form of text
- Television classes
- Phone call, video call on viber or skype

- At school
- In distance learning
- Both are interesting

and 100 respondents or 40% that it is easier for them to do it in distance teaching, that is, at home. The obtained result tells us that even control exercises are easier for students to solve in regular classes.

- At school
- In distance learning

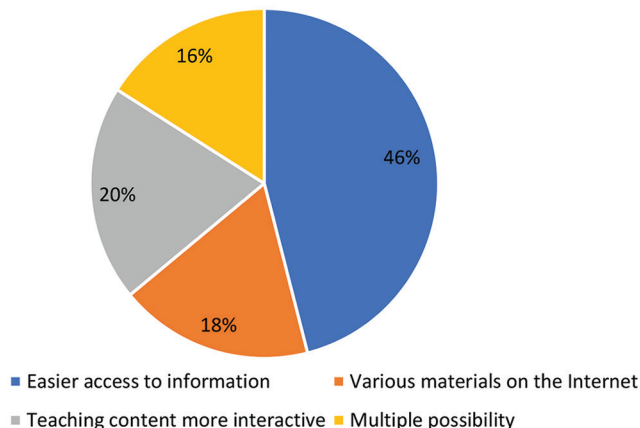**Help with solving tasks in teaching that you most often ask for distance from?**
The answer to this question is as follows, 130 respondents 52% answered that they solve tasks independently, possibly by searching the Internet, 50 respondents or 20% seek help from family when solving tasks, 30 respondents or 12% seek help from teachers, 40 respondents or 16 % seeks help from other students. We conclude that they ask the teacher for the least help for two reasons, one of which is that he is physically the furthest, as well as the persistence to have other possibilities to contact the teacher regarding solving tasks.

- Self-solving
- Family
- Other students
- Teacher

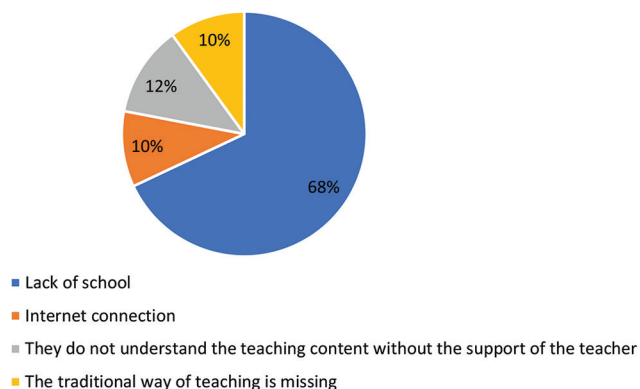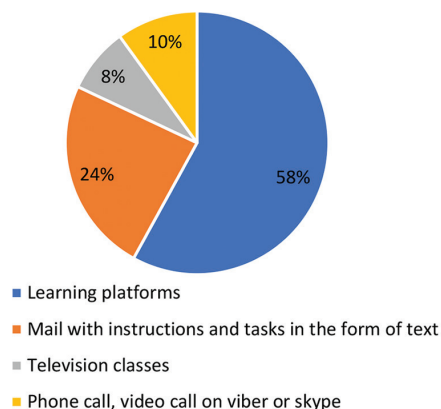**What do you think are the advantages of distance learning?**
To this question 115 respondents or 46% answered that it is easier to access information, 45 respondents or 18% answered that the materials

Are there any subjects whose material is very difficult to follow through distance learning? State which?

To this question, 170 respondents or 68% answered that they have difficulties with some subjects in this way of working. While 80 respondents or 32% answered that they have no difficulties in this way of working.

Students mostly mention mathematics, physics as subjects where they have difficulties. They also mentioned a number of professional subjects and they mentioned the least subjects from the social sciences.
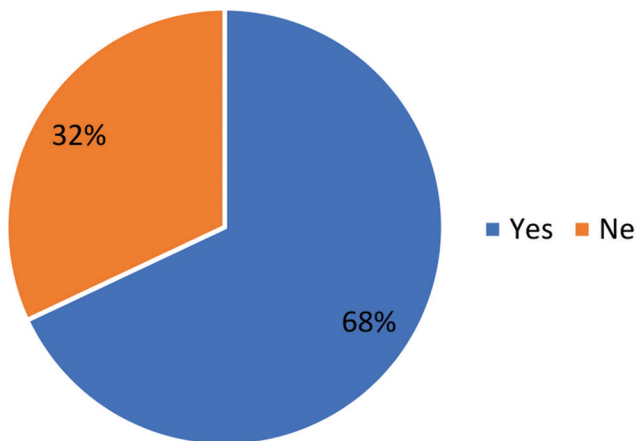
Through which device do you use the Microsoft Teams learning application?

To this question, 150 respondents or 60% answered that they use the Microsoft Teams application over the phone, 50 of them or 20% answered that they use it through computer, 30 respondents or 12% answered that they use it both over the phone and through computer, while 20 of them respondents or 8% answered that they do not use any device, that is, that Microsoft Teams do not use the application in any way.
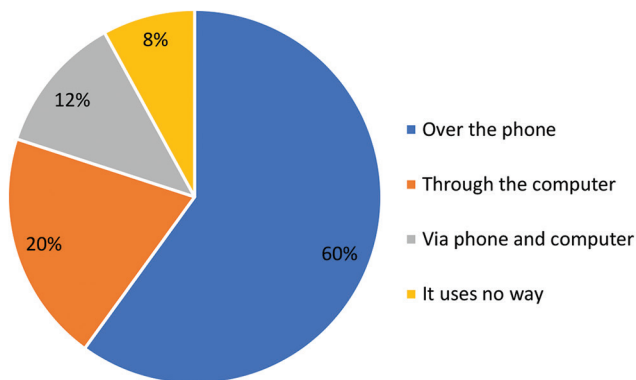

We found that most students use the app over the phone, probably because it is the most accessible option and the easiest way for them to get the necessary material.

**Do teachers regularly schedule classes at Microsoft Teams?**

To this question, 200 respondents or 80% answered that teachers regularly schedule classes. It should be noted that some teachers use video calls through Viber or Skype applications due to their age and inability to navigate through this application, 50 respondents or 20% answered that some teachers do not schedule classes regularly on Microsoft Teams.

The conclusion is that most teachers are active in every way and try to transfer their knowledge to students in every way.
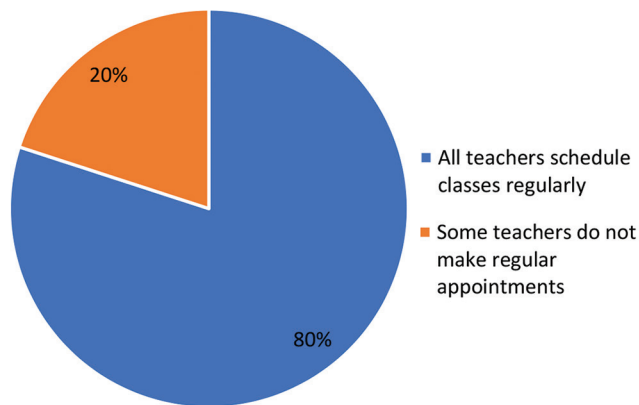

Do teachers regularly post materials on Microsoft Teams?

To this question, 180 respondents or 72% answered that all teachers regularly post materials and that it facilitates their learning, 30 respondents or 12% answered that some teachers ask them and some do not, while 40 respondents or 16% do not ask them and this makes it difficult for them to learn at a distance.
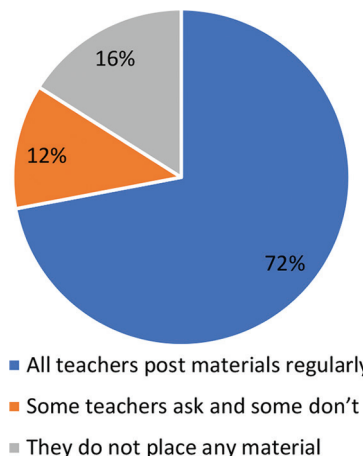
How satisfied are you with your education through the Microsoft Teams platform?

To this question, 120 respondents or 48% answered that they were satisfied, 100 respondents or 40% answered that they were not satisfied and that the traditional way of teaching was better, 30 respondents or 12% answered that they were satisfied but had learning difficulties.
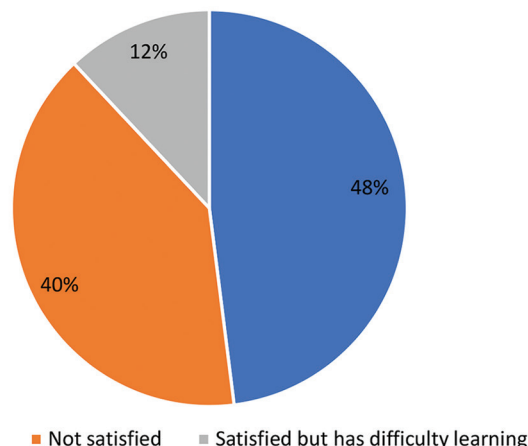
What are your suggestions for making distance learning better and more interesting?
From this question, we received several suggestions such as to be more creative tasks, to make teaching more interactive, to reduce teaching units to the essence, with more video content, to have more classes designed through the game, fun to have knowledge quizzes, more additional instructions for work, that in video clips teachers explain some difficult teaching units, and that there is greater cooperation with teachers.

DISCUSSION

We are aware of all the obstacles that we have gone through in the past 2 years. With the advent of the COVID-19 pandemic, many things were not the same. Life has taught us that at any moment, there can be a change in the whole way of life. We made sure that in a short time, our life changed and that it was once necessary to switch to a permanent habit of the so-called virtual way of life where all activities were transferred to the virtual part. We know that in that period, all educational institutions were blocked and that teaching had to be conducted at a distance, we know that in many countries it existed before its appearance, but not as actively and with as much need as then. We know that the educational system of the Balkan countries, when the application of technical aids is underrepresented, that the biggest reasons are of a financial nature, that there is no possibility of equipping the most modern technical aids, it is not possible to report quality teaching. Recommendations The Ministries of Education were at an enviable level with the organization of an online seminar for teachers. Video lectures from all subjects for primary and secondary education and broadcasting through public services, a multitude of activities to be in the service of every teacher and student at all times. For those students who are from rural areas where the coverage of the internet is very weak or not organized at all by mail or other ways to provide them with material in an adequate way and that they can always be more active.

We must agree that many studies have shown that there are many shortcomings when distance learning is in question. There is a great fear among many scientists that the past 2 years will be detrimental to the education system for reasons known to them and that we who work in schools conclude that a number of students did not cope in the right way when it comes to distance learning and have difficulty continue their education. From their presentation, we conclude that they lack the knowledge that was necessary for them to learn at that age.

Thanks to applications such as Google Classroom and Microsoft Teams, in addition to everything that happened to us, we had the opportunity to at least slightly mitigate all the consequences that befell us and at least to be a little more adequate and available to students.

CONCLUSION

From all the above, we can conclude the following from the answers from the survey:
1. That students are more satisfied with the traditional way of teaching.
2. That they most often used the Microsoft Teams communication channel.
3. That students independently use internet platforms.
4. That lectures in school are more interesting than in distance learning.
5. That it is a test of knowledge, control exercises are easier to solve in school.
6. The advantages of distance learning are easier access to information.
7. Disadvantages of distance learning are: Lack of school and lack of understanding of content without the support of teachers.
8. There are subjects whose material is very difficult to follow through distance learning such as mathematics, physics, and other natural sciences.
9. The Microsoft Teams platform is mostly used by students over the phone.
10. All teachers were azure in their own way and through their abilities available to students for the best possible content and help students.

The final conclusion is that as far as Montenegro is concerned, distance learning will show its true success or failure in the next few years. Yes we as teachers will feel it best and see how successful we have been and how active we have been during the pandemic. From my humble opinion, one can already feel the shortcomings, especially of those who were students in the final grades, where they skipped a lot of the things they needed and did not learn adequately.

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