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Multimedia Systems in Education

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Abstract— **This paper provides an overview of multimedia systems used in education. The advantages and disadvantages of multimedia systems for educational purposes are presented. In addition, multimedia applications used in virtual teaching and software for keeping pedagogical records are shown. The paper also contains an empirical study conducted among high school and university students that shows their evaluations of distance learning.**

Keywords - multimedia systems, education, distance learning

I. INTRODUCTION

The influence of the current world situation leaves a significant mark in the sphere of education and fundamentally changes the approach to learning and conceptualizing the way and type of teaching itself. We are witnessing sudden changes in the education system at all levels, and we are trying every day to overcome the steps to make the most of all available resources. Today, multimedia systems are used more and more in distance learning, and this is not about the situation but about the very way of global change in the education system, which provides lecturers and students with a range of additional opportunities, but also makes it challenging to work in some environments. The system is based on the exchange of multimedia content that contains large amounts of material for the adequate education of students. Models vary depending on the ability of the lecturer and the ability of the student. Since the 21st century has still not managed to connect every inhabitant of this planet to the Internet, a problem arises in communication, where solutions are found in various ways. "Zapad" was the first to start with these systems and, through various studies, brought results that were more than excellent for that time, but the educators somehow did not like it, not because of the way of teaching, but because of the inexperience of the lecturers in new technologies. According to Perraton, this type of learning is also called free learning, using computers, the Internet, and other multimedia accessories for learning at home.

Learning is organized as a dialogue process in virtual classrooms, and this means the separation of the mentor from the student in space and (or) time [1].

As a whole in the education system, electronic learning includes the following items that distinguish it from the traditional way of teaching:

- distance between lecturer and student;
- structure and goal of the program being studied;
- content required for teaching;
- system of legal valuation prescribed by the Rulebook.

As this type of learning becomes a problem due to individuals who make a big difference between this way of learning and the traditional one and make bad comments, a specific rulebook is prescribed that defines the classification,

division, method, and teaching model. As multimedia is the future, experts rely on it and use all resources to improve teaching methods. The scope of learning levels, assessment methods, evaluation, and teaching accreditation are set. The professor's activity contributes to the organization of the content, and the dedication to making presentations, videos, tasks, and multimedia supplements, awakens the student in the knowledge that the lecturer cares that he acquires that knowledge.

The solutions to this type of learning can be divided and classified as follows:

- electronic books;

- educational programs;

- online courses;

- web platforms.

II. ADVANTAGES AND DISADVANTAGES

The advantage is reflected in the flexibility of professors and students, and through activity and up-to-dateness, specific content can be viewed more than once, which makes it easier for students to master the material. The advantage is reflected in the possibility that students can study from their residence without going to another city or country, which leads to lower costs and the possibility that the student can work while studying. One of the most important advantages is the possibility that students who have a severe illness or some form of disability can follow lectures and exercises. A higher level of organization of the time spent on responsibilities related to lectures, choosing one's pace of learning, and taking exams. Another great advantage is that students can choose courses and programs as they wish, choose lecturers and the method of delivery, and the student can attend some prestigious and high-quality courses that are not from their country. The choice defines the level of interaction, from which students can choose classic written interaction, where students extract notes from the text of the presentation, interact with lecturers and colleagues via web applications, or even learn through modern multimedia systems that provide quality information in addition to quality graphics and sound. Through multimedia applications, students can acquire practical skills and all necessary knowledge through various simulations.

Disadvantages are considered to be that for this type of teaching, each participant must have basic knowledge of using computers and the Internet for learning purposes. Without specific knowledge, students will not be able to use the material they receive acceptably. In addition to all the knowledge, it is necessary to have better equipment for learning, which implies better computer specifications that will run various multimedia content. In addition, a high-quality Internet connection is required, which causes up to 80% of technical problems due to classes and inconvenience due to tests. Furthermore, an Internet connection reduces the student's concentration and creates additional pressure - deciding more independently how and when learning brings greater responsibility to students. Sometimes the credibility of the student's work is also a disadvantage because, without additional applications, the professor has no insight into whether the student has used the Izora when preparing for exercises or exams.

III. MULTIMEDIA APPLICATIONS FOR LEARNING

For such a system to function, various supports are needed in the form of various applications, programs, and accessories that facilitate communication in the quality of teaching. The Internet is full of various systems, applications, and services for transferring knowledge, but a few fulfill all the technical aspects of an educational application. The Senate of the University of Serbia decided to conduct classes with the help of distance learning systems and with the help of web applications for meetings. Each higher education unit has its own platform solely due to work efficiency and the number of students who access the content simultaneously.

A multimedia system is a system capable of processing multimedia data and applications. The primary function of multimedia systems is processing, storing, producing, manipulating, and displaying multimedia information. A multimedia system is a computer that combines the application of telecommunications, image, sound, and video sequences [2].

The most frequently used online learning platforms are:

- Moodle;

- Zoom;

- Google Classroom;

- Google Meet;

- Microsoft Teams.

Certain higher education institutions independently develop platforms for distance learning.

IV. VIRTUAL TEACHING

In addition to traditional teaching, there is also virtual teaching, which awakens the desire for progress and knowledge acquisition in students. It is often a combination of state-of-the-art multimedia systems that give the impression that students are dealing with a topic in real time that students can only look at in books. American studies have shown that the feeling of learning is more awakened in young children through interactive teaching. The level of student knowledge is also based on the visual power of observation, where through various simulations, the student has the opportunity to, for example, be present in rare situations such as the launch of a rocket. A virtual classroom is a teaching environment that resides in a computer-generated communication support system. It is not built of steel and concrete but consists of a set of communication groups and workspaces with complex software.

Interactive whiteboards have been on our market for many years and have found their place in the educational system. Currently, not many schools have them, but the trend of their use is increasing. On the other hand, teachers worldwide have different opinions about using interactive whiteboards, and discussions about their effectiveness have been going on for some time. Then we mentioned the factors that affect the effectiveness of interactive whiteboards and accompanying teaching materials. We also talked to several teachers and asked them to share their skills and experience using interactive whiteboards. Publishers quickly recognized the potential of interactive whiteboards and created interactive textbooks. Today on our market, as additional textbooks, we can find interactive textbooks for learning foreign languages from foreign publishing houses. Teaching materials in foreign languages usually contain many exercises, so the accompanying software of the interactive whiteboard also contains additional video material that helps the teacher's work.

V. EMPIRICAL RESEARCH

The research aims to examine high school students and students about the use of online learning platforms and to evaluate the effectiveness of online learning platforms.

High school students and students from Belgrade, Valjevo, and Novi Sad participated in the research.

The sample consists of 128 respondents, of which 99 and 29 high school students were randomly selected from all years of education online via Google questionnaire.

This research had the following tasks:

- Determine whether high school students and students consider multimedia educational platforms beneficial and to what extent;

- Determine which platforms we are talking about;

- Determine whether high school students and students are for online or traditional teaching methods;

- Determine with what grade high school students and students evaluate the online teaching model.

VI. RESULTS

Based on a sample of 128 students, we can conclude that 85.9% consider platforms to support distance practical learning. However, analyzing the answers, 18 respondents expressed that they were not satisfied with learning support platforms: a group of first-year high school students (12) and a group of first-year college students (6). From this analysis, we conclude that online platforms to support distance learning are helpful to a large extent.

Utility platforms for online learning are given in Fig.1. More than 85% of students consider distance learning platforms beneficial.
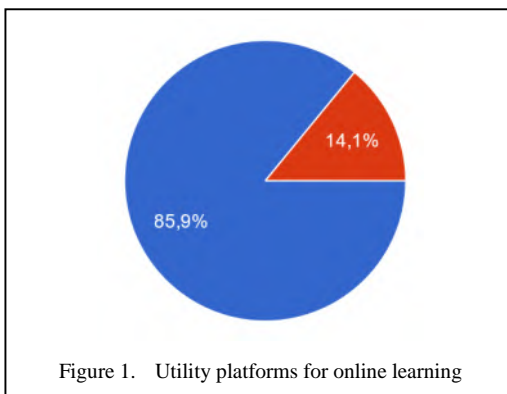

Figure 1.   Utility platforms for online learning

The next item was an examination of which platforms we are talking about, and the results show platforms that we have processed to a large extent, and of course, there are other multimedia sources. For example, the diagram shows that Google Meet, Google Classroom, Zoom, and the Moodle platform are used to a large extent. In addition to them, there is also the Microsoft Teams platform, and finally, to a minor extent, there is the BigBlueButton platform, which achieved its success when it offered its services to the Moodle platform. This analysis concludes that standard and well-known platforms are in use.
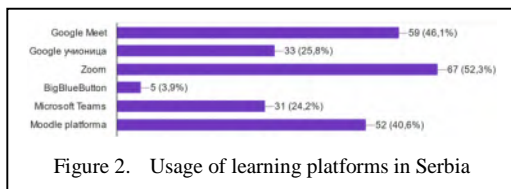

Figure 2. Usage of learning platforms in Serbia

The crucial part of the research was asking the respondents about the teaching method, we know that everyone wants to follow live teaching, but this is less and less possible due to the current situation. Of course, no platform can replace the live words of the lecturer, but the respondents' answers are different from our expectations. In fact, 43% of them think that the online form of teaching is good and that it is not a problem for them. This part includes students in the faculty's third and fourth year, for whom it is a well-known concept, while the rest of 57% is represented by high school students and first and second-year students.
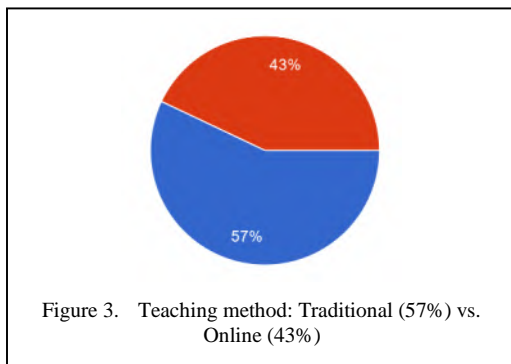

Figure 3. Teaching method: Traditional (57%) vs. Online (43%)

The last and most crucial segment of the research allows us to see how satisfied students are with online teaching. The results are mixed, but the highest percentage of responses ranges between 3 and 5, which is extremely good.

The grade itself is based on the entire lesson, where there are problems with the lecturer. The problems with the lecturers are that most of the
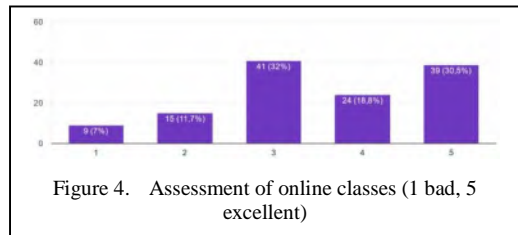

Figure 4. Assessment of online classes (1 bad, 5 excellent)

lecturers are senior professors and are not well versed in this work system, so there is a big problem with the implementation of the teaching itself. Great efforts are needed from both sides to improve the quality of teaching itself.

VII. CONCLUSIONS

Based on the given research, we can conclude that despite all the circumstances, pupils and students support this type of teaching. It is expected that it is difficult for everyone in the beginning because they come across something utterly unknown until now. It takes a lot of patience, effort, and work to achieve great results.

The modern approach to teaching brings us one step closer to the digital revolution, and if nothing else, it encourages us that perhaps with our changes, we can participate in improving this type of teaching.

When compared to traditional teaching, teaching in a multimedia setting has a much greater positive impact on academic achievement and makes the material to be learned much easier to understand [11].

Nowadays, education has progressed in many segments, but there are still problems that can be solved by using new technologies. Education has a more challenging time accepting new and modern ways of education due to the high prices of multimedia equipment. The prices of computers and equipment prevent the teaching staff from delivering the material in the best and most efficient way possible. Although in our country, there is progress in that sphere, on the initiative of the Ministry of Education, Science and Technological Development, numerous projects of digitalization of schools have been launched. Sustainability is reflected in the implementation of dozens of digital classrooms to improve educational content.

We can conclude that it is necessary to use modern educational tools and technologies as much as possible in the teaching process. Using new modern technologies contributes to greater

motivation and engagement of students, which achieves a better way of acquiring and acquiring knowledge.

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