

Chapter 34

E-Education During COVID-19 Pandemic: Apeiron University Practical Experiences



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34.1 Introduction

The COVID-19 pandemic has closed educational establishments around the world and tested the educational world's preparedness for emergency management. At the time of writing, educational institutions are discovering that they will have to finish the current school year with many problems. Many universities were not prepared for this situation. This crisis has not surprised e-education professionals who research and cover these topics in scientific journals. First of all, it surprised the university leadership and the state ministries involved in education.

COVID-19 has put on the test secondary student online systems and has exposed their vulnerability. Everybody had some kind of online solutions, but few universities only were able to provide quality response to the total isolation. Some institutions adapted to online students very quickly because they already had the tools and developed the distance learning (DL) system. This resulted in less disruption for these universities and their students. COVID-19 has forced the educational community to use IT technology causing, besides the combined hybrid way of teaching, the creation of a digital online learning environment that could become the primary way of teaching in the future. These changes also require new generations of lecturers. Analytics will be more represented as it will be used to follow up many data related to the activity and efficiency of students and lecturers. Universities will quickly realize that distance learning will bring many benefits such as reduced costs, automation, uniformity and activity control, energy savings, reducing vis-a-vis interaction needs, etc. It would be very interesting in the future to make a compara-

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tive study of the competences of students who acquired knowledge by learning online at the time of the pandemic, with the competences of students attending classical teaching process. In the following lines, we will present some of the research performed at Pan-European University Apeiron, Banja Luka, related to the learning process using their distance learning system – Learning Cubes 4.0. We will then provide an analysis of the state of education in the context of the COVID-19 pandemic, as well as the vision of further distance learning system development.

34.2 The Status of E-Education at Pan-European University Apeiron Before the COVID-19 Pandemic

The survey was mostly conducted using a questionnaire [1] that was created in the form of a Web-based application, and as a platform, Drupal 7, a content management system, was used. Most of the collected responds were realized using a printed form on-site at the premises of Pan-European University Apeiron, Banja Luka, with the presence of a control person, who instructed the students on the importance of the survey and gave an additional dose of seriousness during the filling, as recommended by Goran Milas [2, p. 467]. The study included 294 students, which were mostly students in the second, third, and fourth years of the first cycle academic studies. A particular quality of the research is given by the participation of students of the second and third cycle – masters and doctoral studies. The following chart shows the participation of Pan-European University Apeiron students surveyed by year and type of study (Fig. 34.1).

The survey sought answers to the questions:

- What is the representation and utilization rate of ICT on Pan-European University Apeiron, Banja Luka?

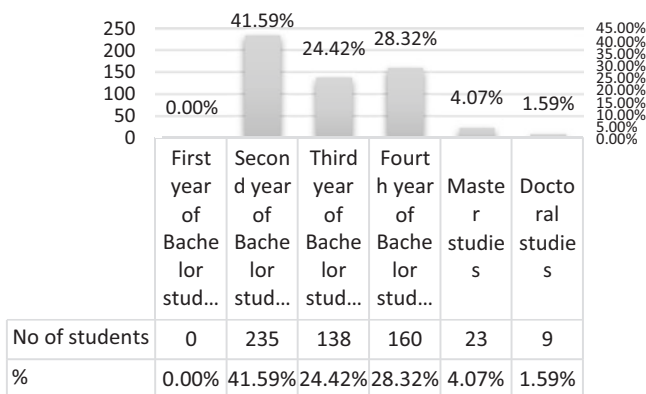


Fig. 34.1 Year and type of studies

- To what extent are educational institutions prepared to use new ICT technologies in teaching?
- What are the effects of the use of multimedia in e-education on Pan-European University Apeiron taking into account all the specificities of this educational space?
- How much is e-education represented in higher education on Pan-European University Apeiron?

The infrastructures, tools, methods, and concepts of collecting, processing, and publishing multimedia content through e-education system were investigated. The readiness of the teaching staff and students to accept and use new educational concepts based on modern ICTs with the indispensable use of multimedia in e-education is analyzed, and suggestions are given on how to improve the existing e-education on Pan-European University Apeiron.

The research fully or partially answered the following questions:

- To what extent are ICTs represented in e-education in our country?
- What is the willingness of teachers and students to use ICT in e-education?
- What are the most commonly used e-learning models in higher education in Bosnia and Herzegovina, and why?
- What technologies and tools are used in the creation of multimedia content, and what is the quality of the content?
- To what extent does the existing information and communication infrastructure provide the technical prerequisites for quality e-learning delivery?
- In what direction will e-education move in B&H?

This paper does not present all the results and all considerations for the above questions and the results obtained due to its nature and limitations. Therefore, in the following articles, we will only present part of this research.

Survey Claim 1 Teachers and assistants enrich classical teaching in the classroom with educational electronic content (PPT presentations, PDF and Word documents, video, audio, etc.) (Fig. 34.2).

The picture clearly shows that the vast majority of respondents have a positive experience with classroom teaching using multimedia electronic educational materials. It can be seen from the response that the teaching staff in direct teaching is using electronic educational materials to a significant extent. Here are some reasons why: (a) It is easier to teach using multimedia materials already prepared. It is linearly passed through the classes (it is less possible to skip or forget something), and the prepared materials are also used in the next school year in the same form or most often refined to a lesser extent. (b) The teaching institution expects the teaching staff to have a modern and innovative approach to teaching. (c) Students love new technologies and this approach suits them.

Survey Claim 2 I am generally satisfied with the quality and volume of electronic content provided by my institution through the distance learning system (Fig. 34.3).

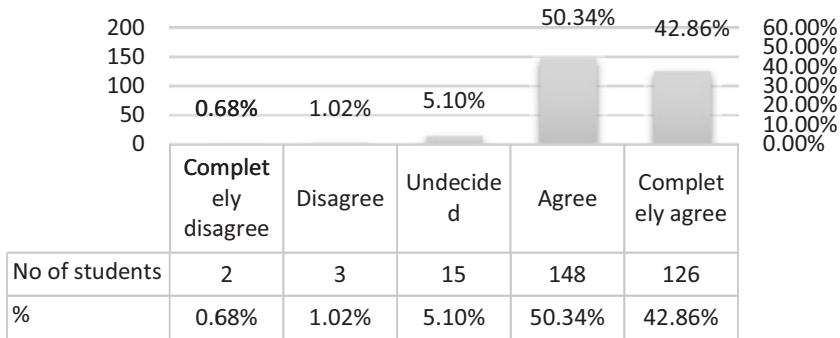


Fig. 34.2 Average rating 4,34

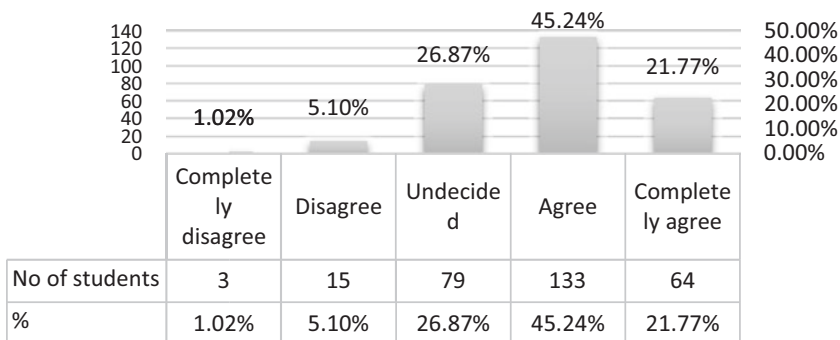


Fig. 34.3 Average rating 3,82

The volume and quality of electronic content in DL systems very often do not depend solely on the teachers in charge. Well-organized and well-prepared educational multimedia material requires the involvement of some other persons, such as video editors, Web developers, graphic artists, speakers, animators, and certainly administrators. A virtual subject often contains materials that are not directly related to the actual lecturer. In distance learning systems, it is often the case that older video material is stored from previous presenters or PPT presentations or scripts from years past. Therefore, in the statement, instead of “... the lecturer provides me ...,” it states “... which my Institution provides for me ...” Delivering educational multimedia materials through the distance learning system requires considerable investment in infrastructure, training, preparation, processing and publication of materials, support, etc. In general, the results obtained are encouraging and show that there are educational institutions that support and invest in a distance learning way of teaching and listening to the teaching.

Survey Claim 3 The other electronic resources I find (YouTube video, electronic encyclopedias, electronic libraries, presentations, etc.) that I need to successfully pass the course and prepare for the exam are extremely important to me (Fig. 34.4).

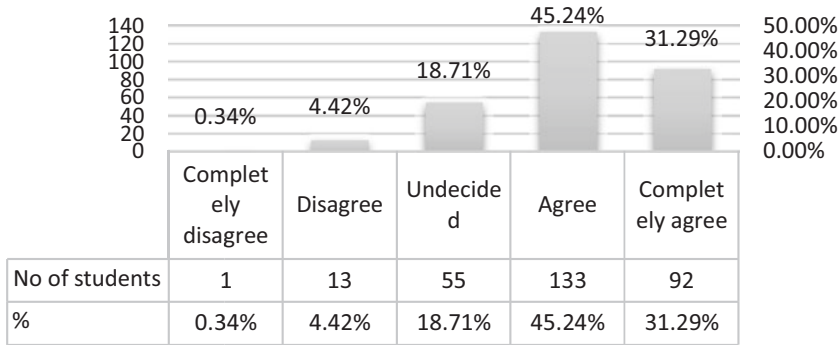


Fig. 34.4 Average rating 4,03

It would be unrealistic to expect the students’ research spirit to be limited to classical teaching and predefined electronic multimedia materials. The Internet has globalized knowledge, now available in an incredible variety of forms, with access with a few mouse clicks. For example, the big YouTube has grown from entertainment to the largest educational multimedia video service in the world. Especially today, in a time of rapid change, expansion of knowledge, and new technologies, free access to world resources is getting full sense. Pan-European University Apeiron is aware of the need to acquire knowledge beyond the usual educational forms. That is why it gave its students free access to the most respectable protected databases of electronic books, magazines, journals, etc. Access to protected databases is extremely useful for students, as they can find relevant and up-to-date knowledge that is not published freely on the World Wide Web.

Survey Claim 4 Generally, the institution I study at is ready for the use of new ICTs and invests significant funds in material and technical and logistical support in delivering e-learning (Fig. 34.5).

New multimedia educational concepts require new technologies, considerable financial investments, adequate materials, and technical support, with the main goal of acquiring knowledge in quality and interesting way. The teaching model at Apeiron University fits into a hybrid model of teaching, where e-learning is intertwined with the classical methods of teaching and learning, and this is obviously the model most commonly encountered in B&H. Most respondents found that the distance learning systems they access complement the classic classroom teaching excellence. For example, Pan-European University Apeiron performs screen capture in video format, which is displayed in HD quality combined with associated classroom videos. Thus, for example, the exercises in the higher programming languages – C++ – are performed in a computer room with video projection, where students monitor the performance of the tasks (programming) with the lecturer and then the recorded activities from the lecturer’s screen are later thoroughly reviewed and the tasks are taken home (the programming code is seen). Some teaching activities require dominant classical teaching where the role of multimedia via the DL

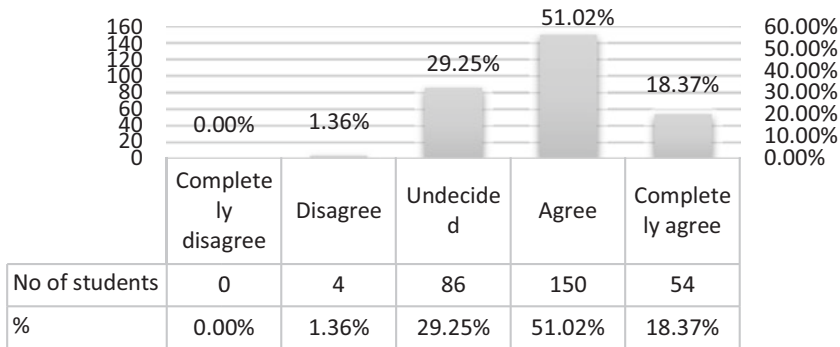


Fig. 34.5 Average rating 3,86

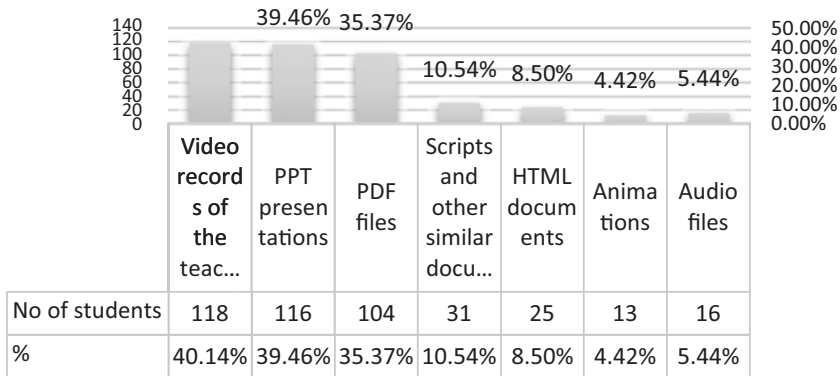


Fig. 34.6 Survey results

system is diminished. An example of such activity is the practical fabrication of a denture in the dental laboratory of the faculty.

Survey Claim 5 Which type of multimedia content is most important to you? (Fig. 34.6)

Students were provided with multiple answers for this claim. The results show the affinities of the students toward important multimedia content. Three types of multimedia content stood out by representation: videos of lectures and exercises 40.14%, PPT presentations 39.46%, PDF documents 35.37%. These results can guide Apeiron to which multimedia content should be given special attention and continue to work on their quality. Other types of multimedia content that are less important to the students surveyed should by no means be ignored.

The research sets up one main and three auxiliary hypotheses that have received the following epilogue:

- H.1: By using multimedia in teaching, heterogeneous positive effects of knowledge acquisition and dissemination are achieved. (*Proven*)
- A.H.1: The application of multimedia with the use of modern computer technologies positively influences students' motivation to attend teaching activities. (*Proven*)
- A.H.2: Multimedia in electronic education becomes the standard for quality teaching at Pan-European University Apeiron. (*Proven*)
- A.H.3: The willingness of teachers and students in higher education at Pan-European University Apeiron to adopt and use new educational concepts based on multimedia with the use of modern ICTS is different. (*Not proven*)

Pan-European University Apeiron has built a system where videos from classrooms are synchronized in real time with presentations made by teachers on screen. This simulates the physical presence of students in the classroom. Students who use the system can also view video lectures from past years, so they are more advantageous to those who follow classical teaching in this regard. Access to all required materials, at any time, reduces material costs and gives the flexibility of teaching time. There are around 400 courses taught at Pan-European University, and it is quite clear that it is a huge challenge to translate all of these courses into virtual form. Pan-European University Apeiron has found a great way to translate all subjects into video form, and it involves the automatic recording of all classroom activities via an IP camera, with automatic screen capture of on-screen activities, which combine very useful video material in real time. Later, in simple postproduction, breaks in lectures are eliminated, so only useful video material is published in the distance learning system. About 10,000 hours of television-edited video lectures are currently published in the distance learning system, which is a very respectable knowledge base.

34.3 E-Education in the Context of COVID-19 Pandemic

In response to the spread of the COVID-19 in early 2020, almost all European countries have stopped teaching classrooms and activated e-learning systems at the same time. In the context of the COVID-19 pandemic, students left their student campuses and continued online communication with their universities. Neither state nor university can tell to students how long the pandemic will last and when the universities will reopen their rooms and continue working as usual. Many universities are self-financing from their students' tuition fees, so this situation is a big problem for them as well. The lack of cash inflows can paralyze or destroy such universities. Students have returned to their cities, and some of the cities are in strong isolation. It turns out that many educational institutions in Europe and the world do not have good organization, that their online learning resources are very limited, and that they have not invested enough money or knowledge into the DL systems they now need. In the future, students and their parents are likely to think that their future

studies will be at universities that have good online study solutions. We can also expect a transcript of students from institutions that weren't able to provide an adequate online learning environment to institutions able to provide quality online teaching and to complete the academic year. The policy of enrolling educational institutions in marketing campaigns will also change, where their ability to perform online teaching in crises will be enhanced.

The mobility of international students could take up to 5 years to recover from the coronavirus pandemic across the world, as universities continue to grapple with the "extraordinary set of challenges" the crisis has created. This is the view of Simon Marginson [3], Director of the Centre for Global Higher Education, speaking at the first virtual iteration of UUKi's annual conference. Asked if universities should price differently for online programs, he said, "If online is going to become a longer-term substitute for face-to-face learning, as it will in some cases, it needs to be seen as a substantially different product.. and it will need a separate pricing structure. The idea that we charge exactly the same price for any kind of online [product] as we charge for face-to-face has to go" [3].

Teachers will adapt to online teaching, and this is a process that cannot be stopped, but realistically, face-to-face teaching is again the primary form of teaching in the new school year.

A large number of universities had their distance learning systems only as a backup for study, resulting in difficult adaptation to the new situation. Creating a good online student environment requires significant financial, logistical, logistical, and other investments, and this takes considerable time. An interesting statement from the Rector of the University of Belgrade, Ivanka Popovic, says: "The exams at the faculties will have to be postponed until the state of emergency is completed because the University does not have enough experience to provide completely objective conditions for taking the exams online. As soon as the state of emergency is completed, intensive classes in blocks will be organized for those faculties where practical exercises and experimental examinations are required" [4].

Effective e-learning models must be guided by sound pedagogical principles and be flexible in order to adapt to the needs and goals of students. The literature recognizes different teaching and learning strategies – linear and constructivist; some authors advocate teacher-centered and other process- and procedure-based learning, but each model deserves attention and consideration as the choice for selection of the learning model should depend on the goals of the program and the needs for the trainees (students) [5, 6]. E-learning delivery methods, methodology, and even knowledge delivery media vary from state to state and from institution to institution. Again, the old problem arose: How and in which way to conduct final examinations, and how to evaluate students' knowledge? Given the volume of the subject matter and the specific nature of individual teaching areas and subjects, this problem is further complicated. Today, all modern distance learning systems can test knowledge, create tests, lead discussions, measure the advancement of students, etc. The question is: How much these opportunities are used? It is technically no problem to provide basic testing and simple automatic knowledge checks, e.g., selecting offered answers or linking offered terms. Problems arise when descriptive, written answers

to questions are required. Automatic scoring is then dropped because the systems do not currently have sufficiently developed artificial intelligence that can intelligently analyze and score such answers (this is being done).

A common problem is that simple automatic forms of assessment are not used fully. The reason for this is a non-systematic approach to solving the problem identified, or there is no clear and firm position of the management that the teaching staff is obliged to create the required number of online tests or quizzes that would be published within the existing LMSs. On the other hand, teachers would have to invest considerable effort in preparing such materials, and when it comes to a large system with a large number of teachers, there are inevitably various problems. Of course, in addition to automatic proficiency testing through DL systems, there is also the possibility of proficiency testing through video chat, e.g., Skype, where the teacher can verbally either examine the students or control their written exam. Videoconferencing has great potential, and it is one of the ways to achieve good communication with students with minimal investment.

Often, educational institutions and their teachers are averse to new solutions because new user environments or new functionalities drive them out of their comfort and already established practices and habits. So the authors (Bauk, Kopp, Avramovic) in their work [7] describe the difficulty of upgrading the Moodle system and raising its functionality to a higher level at the Faculty of Maritime Studies, which is a part of the University of Montenegro: "... Since the program surface of Moodle rather changed with the release of Moodle 2.x FMS decided to stick to the older version. Mainly this is due to two reasons: 1) Teachers and students are used to the look and feel of the 1.9.x versions and it seemed problematical for them to grow accustomed to a new surface especially at an early stage of working with the platform; and/or 2) The installation of Moodle 2.x demands an enhanced technical environment which is not totally available at the FMS at the moment."

Under current laws, a proportion of European countries, including Bosnia and Herzegovina, are not legally allowed to conduct examinations through electronic learning systems. The solution to this specific problem at the time of inability to attend the classical classes due to COVID-19 has come to light, and according to state officials, this problem must be resolved as soon as possible, as the current 2019–2020 academic year needs to be concluded. Laws in this regard must be refined and allow students to take the distance exams because, in a pandemic, this is the only way to end the current school year regularly. The state will have to prescribe standards regarding distance learning systems and online learning in the coming period, as it is its interest and its competence.

A significant part of the funds that could improve the quality of teaching through distance learning systems comes from different funds. Thus, the EU has urgently adopted assistance programs for its member states as well as for non-EU countries in connection with the COVID-19 pandemic. Universities in need of funding for distance learning are eligible to apply and participate in grants.

In the era of the information society, where computer literacy is seen as a part of general literacy, information technologies have been given the function of education, and as such, they have brought some new ways of learning. By modernizing

the teaching methods supported by appropriate hardware and software and by using multimedia teaching resources, the main directions of modern education development are defined [8, 9]. Regardless of the student motivation and satisfaction with the teaching forms of today, it is necessary to introduce continuous innovation also at the level of an individual. As this and other studies show, students and teachers are still not enough aware of the possibilities to make their jobs easier and practical with an appropriate form of providing information [10].

Peter Brandt – Head of the “Knowledge Transfer” Department at the German Institute for Adult Education, Leibniz Centre for Lifelong Learning in Bonn [11], points out that it is crucial to note that the corona crisis has caused a clear lack of alternative – digital tools for educational processes need to be used, where these tools no longer compete with face-to-face learning but are a prerequisite for organized learning in a state of emergency. Perhaps in a few years, the 2020 crisis will be identified as the central catalyst for digitization in education.

34.4 Conclusion

The academic community must be able to embrace the development of new IT technologies and outstanding multimedia capabilities in order to provide more dynamic teaching and learning and more efficient use of space, time, and financial resources. The vision for further development of higher education in the world was given by the Minister of Scientific and Technological Development, Higher Education, and Information Society of the Republic of Srpska, and he emphasizes the following: “This emergence of the corona virus situation, in addition to all the negative consequences we are facing and will face, has shown us something important, namely that the teaching process can be innovated in line with modern, technologically supported trends. The assessments by foreign experts that I have been able to see indicate that, concerning higher education, after this pandemic, it will experience a lot of changes and new practices globally, that higher education institutions will increasingly turn to new teaching methods, and that the traditional practice of physical presence continues to become the exclusivity of the most expensive.” Knowledge delivery systems, communication, and basic control activities have reached an enviable level.

However, the systems for final assessment are still not sufficiently developed, and we can expect their rapid development soon. In the future, the right solutions lie in intelligent two-way communication [12] between intelligent tutoring systems and students, where the e-learning system contains intelligent methods for analyzing, evaluating user knowledge and skills, as well as controlling e-learning processes, monitoring, and optimization.

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