Innovation in Education during the COVID-19 Pandemic

Jana Kajanova[a,*]

[a] *Comenius University in Bratislava, Faculty of Management, Odbojárov 10, Bratislava 820 05, Slovakia*

Abstract

Purpose of the article The university education system has changed as a result of the abolition of classical full-time teaching. Students and teachers moved to online space and classical methods were not suitable for online education. This created a space for innovation, where it was necessary to ensure adequate, high-quality, and equivalent teaching in comparison with full-time teaching. New platforms, tools used in education, teaching and testing systems were applied to teaching relatively quickly to ensure education in such a form as before the COVID-19 pandemic.

Methodology/methods The basic scientific methods of analysis, synthesis, comparison, deduction, mathematical-statistical methods were used in the processing of the paper. Based on the acquired knowledge, we generalize information and provide conclusions usable for education at universities with an orientation to business and management.

Scientific aim The aim of this paper is to present innovation in education that were applied at the Faculty of Management, analyze their introduction into teaching, identify their positives and negatives and create recommendations for education at universities.

Findings The use of new platforms, the offer of recorded lectures and extended materials for individual education and the subsequent possibility of online consultations proved to be the best solution for ensuring the quality of education. However, we still identified insufficient contact "student vs. teacher", which cannot be eliminated by a larger number of students in online groups.

Conclusions The success of the transition from full-time to online education is a key topic in scientific research, as the COVID-19 pandemic period continues. Uncertainty about what form of education teachers will continue in the coming period is one of the factors influencing the development of modern approaches used in university education, preparing teachers for teaching processes and creating materials that will enable students to acquire the necessary knowledge, skills and knowledge, and experience.

Keywords: university education, on-line education, COVID-19 pandemic, innovation, modern approach

JEL Classification: I21, I23

[*] Corresponding author. Tel.: +421 907 279 213
E-mail address: jana.kajanova@fm.uniba.sk

Introduction

Within a few days, education in Slovakia, as in many other countries, rapidly changed. The SARS-CoV-2 pandemic has closed educational institutions. As such a situation has not yet appeared historically in the Slovak Republic, it was not possible to prepare for such development in advance. The COVID-19 pandemic has affected education and teacher education in particular, in various ways (Carrillo, Flores, 2020).

The traditional full-time form of education was replaced by a distance form, teachers and students stopped visiting schools and their homes became educational places. Digitization, computers and the internet have become key instruments of education. Higher education has been considered as both an 'engine' for innovation and a 'catalyst' for sustainability development (Cai et al., 2020).

The role of the European Union Commission in curbing the Bologna Process and the Lisbon Research Strategy with its existing educational initiatives to define and broaden the influential vision of European higher education is being debated by many experts (Keeling, 2006).

The university education system has changed as a result of the abolition of classical full-time teaching. Students and teachers moved to online space and classical methods were not suitable for online education. This created a space for innovation, where it was necessary to ensure adequate, high-quality, and equivalent teaching in comparison with full-time teaching. According to Starozhuk et al. (2018) the further methodological and practical development of quality management system in higher educational institutions requires regular management of education technologies as a management object.

New platforms, tools used in education, teaching and testing systems were applied to teaching relatively quickly to ensure education in such a form as before the COVID-19 pandemic. In education, it was necessary to identify opportunities of innovation that are quick and easy to apply. In a very short time, it was necessary to communicate not only with students, but also teachers with each other, mainly online. A number of consultations, discussions as well as the solution of joint projects and tasks have been moved to the online space as well.

There is currently an increasing interest for sustainable innovation in our society. The European agendas highlight the role of higher education institutions in the formation and development of innovation competences among students (Ferreras-Garcia et al., 2021).

On one hand, we needed a quick solution, on the other hand, a relatively cheap, less costly solution. This was often a problem. The equipment of the rooms where the teachers lectured was additionally supplemented by microphones, cameras, and state of art streaming devices that enabled the recording of lectures within the required quality. All these actions allowed the fastest response to the COVID-19 pandemic, which was the introduction of a distance form of education.

Distance learning is a unique solution for the continuation of learning in critical times, such as the case of the recent global coronavirus pandemic (Azhari, Fajri, 2021; Masalimova et al., 2021). The distance form of education is a specific form of education that has so far been associated with lifelong learning. Its use was characterized mainly in university studies, or for shorter educational programs, resp. courses. It uses information and communication tools suitable for this specific purpose.

The use of multimedia in education is important not only in electronic and distance education but also in direct teaching. Multimedia can act as a means of mass and group teaching or as a means of individual study. Using multimedia is nowadays a common learning method. The advantages of interactive multimedia vs. individual differentiated multimedia are mainly that they provide a better, more intense and diverse experience that works not only on the cognitive but also on the emotional side of the student (Glatz et al., 2019; Kajanová, 2020).

Most authors predetermine the distance form of education as a priority for adults, i.e. rather suitable for higher levels of education. This form of education presupposes the relative readiness, maturity and responsibility of the student. It is mainly a separate study of materials, supplemented by appropriate forms of consultations and additional tools. A key tool for distance learning is the preparation of high quality materials, interactive aids, study texts, worksheets, sets of examples, exercises and case studies. The distance form of education can also serve as a tool of education usable even in times of crisis. Currently, the distance form "pushed out" the full-time form, because anti-pandemic measures made it impossible to use traditional forms of education, full-time teaching, restricted the movement of people and the meeting of teachers with their students. In the following section, we focus on identifying its positives and negatives.

1 Scientific aim

The aim of this paper is to present innovation in education that were applied at the Faculty of Management, analyze their introduction into teaching, identify their positives and negatives and create recommendations for education at universities. The paper deals with innovations that can be implemented in education, in connection with the COVID-19 pandemic. It also deals with the change from full-time education to distance education, its advantages, and disadvantages, as well as the analysis of research results in the field of distance education. To achieve the main goal, we have formulated a set of partial goals, the fulfillment of which will help us in fulfilling the main goal. These goals include:

- to analyze the method of distance education,
- to standoff present form of education as an educational tool useful both during and outside of crisis,
- to identify the positives and negatives of the distance form of education,
- to provide results from distance education at the Faculty of Management, Comenius University in Bratislava,
- to summarize the implemented innovations in education,
- to make recommendations for teaching in times of crisis.

2 Methodology and methods

The basic scientific methods of analysis, synthesis, comparison, deduction, mathematical-statistical methods were used in the processing of the paper. Based on the acquired knowledge, we generalize information and provide conclusions usable for education at universities with an orientation to business and management.

In the first phase, we set the objectives of the paper, we chose the appropriate scientific methods, which we will use in processing the selected issues, then through the fulfillment of partial objectives we get to the solution, assess the situation, form and formulate conclusions and evaluate the fulfillment of objectives.

In the second phase, we analyzed the results of distance learning on a selected subject in 2020 and 2021. Based on the identification of innovations in education, we have created conclusions and recommendations that can be generalized and used by other universities.

3 Results

The education is a process during which a person acquires and develops new knowledge, skills, abilities and attitudes. Therefore an educational unit shall be capable to adapt itself to the labour market conditions promptly (Chodasová et al., 2015).

Innovative processes in education, as a rule, are considered in relation to three main aspects - socio-economic, psychological-pedagogical and organizational-managerial. From the content of these aspects, the general conditions for the emergence of innovative processes are created. Existing conditions may also hinder the implementation of the innovation process. Innovative processes can be managed spontaneously as well as consciously. Innovation input is primarily a function of managing the process of natural and artificial change. Therefore, the innovative process in education is the process of managing change in education (Olimov, Mamurova, 2021).

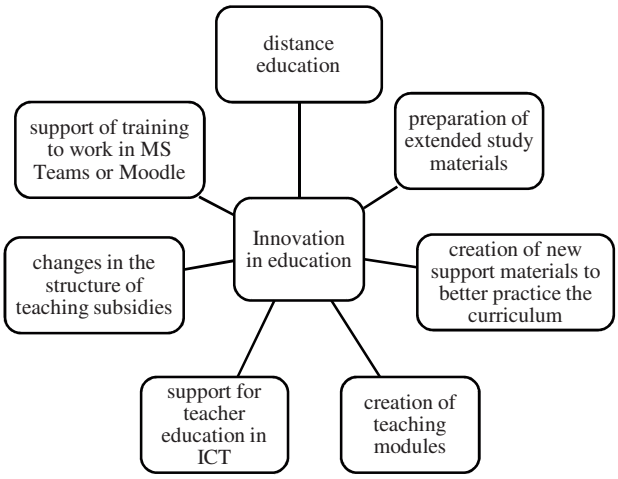
Sociologists have observed fact that the last three - four generations of mankind can be chronologically defined by the specific behavior and expressions. According to sociologists, each of these generations has its own specific way of life and the resulting special requirements that shape technologies (Barnová et al., 2018).

The use of information and communication technologies is basically the basis for distance learning. Following the previous statement, we can assume that generations coming to the educational process at universities are often more skilled in the field of IT than some of their teachers.

According to Kahn (2018) we consider as innovation in general: generating new ideas and thoughts, new knowledge used in the production of products or services, innovation as a process, resp. change tool, method, resp. thinking style, process, a new, improved solution.

3.1 Summary of innovation in education

Innovations that will help to master the new form of education clearly include: distance education, preparation of extended study materials, creation of new support materials to better practice the curriculum, creation of teaching modules, support for teacher education in information and communication technologies, changes in the structure of teaching subsidies (subject area - subsidy of time for lectures and seminars), support of training to work in MS Teams or Moodle (Figure 1).



Source: own ellaboration, 2001

Figure 1 Innovation in education

On the one hand, the rise of new technologies brings a number of innovative educational activities, on the other hand, it has not yet been reliably examined whether digital technologies contribute to the real transformation of education. For this reason, it is necessary to seek a balance between the attractiveness of teaching methods and the medium to which new knowledge is mediated on the one hand and the measurable quality of education on the other (Barnová and Hlásna-Krásna, 2018).

3.2 Positives and negatives of the distance form of education

The advantage of distance education is its ability to efficiently and economically satisfy the needs of a large group of students. (Huba, Orbánová, 2001). This is one of the reasons why it is appropriate to use distance education normally outside the crisis period. Lower demands on the capacity of classrooms, mass preparation of materials, the possibility of mass testing, time savings and financial savings. For better transparency, we have shown the positives and negatives of distance education in Table 1.

Table 1 Positives and negatives of the distance form of education

Positives	Negatives
effective satisfaction of a larger group of students	complexity of computer equipment
time savings in education	the need for a good quality internet connection
simplicity of space equipment	preparation of specific materials
mass preparation of materials	absence of contact: student x teacher
possibility of mass testing	higher probability of information noise
financial savings	high demands on preparation by the teacher
greater involvement of the student in the educational process	less social contacts
less stress in written evaluation	the problem of objective assessment of written performance, when the teacher can not check whether the student worked independently
study in a quiet home environment	

Source: own elaboration, 2021

The transition from full-time to distance learning was immediate. Although at the beginning we could not estimate how long we will be teaching in this new regime, many teachers used their knowledge and experience in the field of IT and communication technologies. As there were no general guidelines and clear rules on how to approach distance education at the beginning, many teachers became self-educators, discoverers and at the same time students in the acquisition of new tools and opportunities for distance education. Within a few days to weeks, we started to "stream" lectures, use Microsoft tools - such as MS Teams to lead seminars and exercises and provide students with appropriate repositories, e.g. to Share Point Study Materials.

For the lectures, we used the free platform Twitch (as well as many other free internet platforms), which has good coverage even with a large number of students, as we worked with a version that can connect 80-100 students at the same time. Later, the number of students attached to one lecture was 200 - 250. After a few weeks, the collective guidelines recommended using only MS Teams for teaching and not other publicly available platforms MS Teams updates allowed higher amount of students at the same time, early versions did not work properly with large groups.

Some lectures (containing more demanding subjects) were recorded and students could listen to and watch them repeatedly. In addition to the recordings, we also placed all the presentations in ppt form (in Power Point) for the students at Share Point, which they could use for their studies. An overview of "views" of ppt presentations is given in Table 2.

Within the selected subject (compulsory for students of the first year of bachelor's study), we also took into account the number of enrolled students for the given subject. In 2020, 390 students were enrolled and in 2021 their number dropped to 365. The decrease in number of students was 6.41%.

Table 2 Views of Power Point presentations on Share Point

Presentations	Views in 2020	Views in 2021
Lecture 1	792	681
Lecture 2	650	714
Lecture 3	676	649
Lecture 4	868	746
Lecture 5	843	785
Lecture 6	869	841
Lecture 7	808	812
Lecture 8	605	759
Lecture 9	516	774
Lecture 10	487	819
Lecture 11	399	726
Lecture 12	414	706

Source: own elaboration, 2021

The number of views clearly declares the students returned to the individual lectures several times. This is also confirmed by the evaluation, which is not complete, but the interim results indicate a higher readiness and better results achieved in the evaluation of the subject than in previous years. Despite the reduced number of students, the number of views of individual lectures increased in most lectures (Table 3).

Table 3 Percentage change in the views of presentations (2021/2020) [%]

Presentations	Percentage change in the views of presentations
Lecture 1	- 14,02
Lecture 2	+ 9,85
Lecture 3	- 3,99
Lecture 4	- 14,06
Lecture 5	- 6,88
Lecture 6	- 3,22
Lecture 7	+ 0,50
Lecture 8	+ 25,45
Lecture 9	+ 50,00
Lecture 10	+ 68,17
Lecture 11	+ 81,95
Lecture 12	+ 70,53

Source: own elaboration, 2021

Seminars were also held for the lectures, in the form of MS Teams, so that students had the opportunity to consult directly with teachers. The control and continuous assignments helped the students to study continuously, to submit worksheets and their assignments at regular intervals, and in this way to responsibly prepare for the exam in this subject.

As part of innovation, online education has also required more extensive preparation of materials for students and their publication well in advance. The preparation of materials and the mastery of new tools, which are necessary to support distance learning, were challenging, but not unmanageable. The advantage of the teachers was the Power Point presentations prepared in advance, as they could be used as a starting point for new study tools. Worksheets, examples, and case studies have been shared on the screen with students, which allowed basically very good contact: student vs. teacher. However, some difficulties arose with hardware issues. Threats to quality teaching were mainly the lack of microphones, speakers, good internet connection and sometimes all computer equipment at such a level that it is possible to conduct lectures and seminars online.

We also identified a similar problem on the student's side, they often shared one computer within the family, they were not able to connect at the given date and time, as another family member was receiving other online teaching, or parents were at home and worked from home office. When several family members were connected at the same using video streaming, their Internet connection often literally collapsed.

Conclusion

Distance education seems to be a suitable form to deal with the crisis period, when the situation does not allow the attendance form of education. It has its positives and negatives, but its use even in times of crisis is obvious.

We see the main limits in the assessment of results and analyzed data in a very short period of monitoring the distance form of education, little published experiences, results and conclusions.

The use of new platforms, the offer of recorded lectures and extended materials for individual education and the subsequent possibility of online consultations proved to be the best solution for ensuring the quality of education. However, we still identified insufficient contact "student vs. teacher", which cannot be eliminated by a larger number of students in online groups.

As part of the results, we present the experience with distance education during the "Covid-19" crisis in Slovakia. The main findings include: the number of students in lectures has increased with the transfer of education to the online form, the distance form does not have a negative impact on the learning outcomes of students' knowledge and knowledge, nor on the perception of students in the distance form of education.

The success of the transition from full-time to online education is a key topic in scientific research, as the COVID-19 pandemic period continues. Uncertainty about what form of education teachers will continue in the coming

period is one of the factors influencing the development of modern approaches used in university education, preparing teachers for teaching processes and creating materials that will enable students to acquire the necessary knowledge, skills and knowledge, and experience.

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