Investigating critical factors influencing the acceptance of e-learning during COVID-19

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Abstract

Background: In order to prevent the spread of the Covid-19 virus, a temporary interruption of teaching and educational activities in classrooms occurred. Most schools and faculties were forced to switch from traditional to online teaching.

Purpose: This research aims to examine the key factors influencing students' intention to use e-learning, as well as predictors of student satisfaction with online teaching during the Covid-19 pandemic.

Study design/methodology/approach: The analysis includes 312 students on the territory of the Republic of Serbia who use e-learning. Reliability analysis, confirmatory factor analysis and structural equations modeling are applied in the paper.

Findings/conclusions: It is found that course design significantly affects perceived usefulness, perceived ease of use and quality of e-learning, and perceived usefulness and quality of e-learning are the main drivers of student satisfaction. Then, perceived usefulness, perceived ease of use and satisfaction with online teaching are important predictors of the attitude towards the use of e-learning, and attitude is an important driver of the intention to use e-learning. The results of the research and the implications derived from them can be helpful to educational institutions in creating, introducing and implementing e-learning, as well as increasing student satisfaction with online teaching during the pandemic.

Limitations/future research: The limitation of the research stems from the selection of the sample (students). In addition, the research was conducted on the territory of Serbia, so the results cannot be generalized. Third, the possible bias of the respondents in giving answers can lead to wrong conclusions. The recommendation for future research is to examine the attitudes of professors who use e-learning, in addition to students. Another recommendation is to do a segment analysis (by gender, year of study) in order to develop specific strategies for each segment. Another suggestion is to compare students' opinions on e-learning and traditional ways of learning.

Keywords
e-learning, COVID-19, TAM, course design, satisfaction, online teaching

Introduction

The Internet and modern technology have greatly influenced education and led to the emergence of online learning. Online learning, i.e. e-learning, has been applied in many higher education institutions around the world for the last 15-20 years (Ibrahim, Leng, Yusoff, Samy, Masrom & Rizman, 2017; Li, Zhan, Liu & Tong, 2022; Gamage, Ayres & Behrend, 2022; Ratna & Mehra, 2015; Cheng, 2012; Drennan, Kennedy & Pisarski, 2005). E-learning differs from the traditional way of learning in that it gives priority to individual learning over group learning, because it encourages students to learn individually at home, rather than in groups and classes (Al-Rahmi et al.,

2018). It can also be seen as an innovative approach to providing educational services through information in electronic form that improves the knowledge and skills of students (Pham, Limbu, Bui, Nguyen & Pham, 2019).

The Covid-19 pandemic has encouraged all educational institutions to incorporate technology into learning processes. In general, there is a much greater use of e-learning, as many educational institutions have transferred traditional teaching activities to the online world. In such conditions, there is a growing need for the adoption of e-learning, both by teachers and students. The Technology Acceptance Model (TAM) developed by Davis, Bagozzi and Warshaw (1989) is the most commonly used model in studies that examine user technology acceptance. The TAM model has also been widely applied in studies researching e-learning. Using TAM as a theoretical basis, this research aims to examine the key factors influencing students' intention to use e-learning, as well as predictors of student satisfaction with online teaching during the Covid-19 pandemic. Although a great number of studies focus on e-learning, the main research motivation is e-learning in the specific conditions of the Covid-19 pandemic. This research is expected to contribute to the literature, spreading knowledge about key predictors of e-learning technology acceptance, as well as about the factors that affect student satisfaction with online classes during the COVID-19 pandemic. In addition, the results of the research and the implications derived from them can be helpful to educational institutions in creating, introducing and implementing e-learning, as well as increasing student satisfaction with online teaching during the pandemic.

The paper consists of four parts. The first part of the paper refers to the literature review in which theoretical and empirical findings in the field of e-learning are given. The second part of the paper includes the research methodology, and the third the results of the conducted empirical research. The fourth part of the paper presents a discussion of the obtained results, theoretical and practical implications, limitations, as well as future directions of research.

1. Review of literature

1.1. E-learning

In order to prevent the spread of the COVID -19 virus, a temporary interruption of teaching and educational activities in classrooms occurred. Most schools and faculties were forced to switch from traditional to online teaching, which was a real challenge for these educational institutions. Obeidat, Obeidat, Obeidat and Al-Shalabi (2020) point out the lack of technical support, awareness, readiness, skills, resources and infrastructure as challenges for the adoption of e-learning. In addition, trust issues, resistance to change and financial issues are important factors for the success of e-learning.

E-learning is the use of telecommunications to deliver information for education and training (Sun, Tsai, Finger, Chen & Yeh, 2008, p. 1183). Ibrahim et al. (2017, p. 872) state that e-learning is the use of an Internet connection to improve the delivery of teaching materials, communication and cooperation between students and professors in a virtual environment. Nikou and Maslov (2021, p. 300) define e-learning as a comprehensive technological system for teaching, while participation in e-learning for them is an act of using telecommunications to attend classes and learn within such a system. As a model of learning unlimited in time or space, e-learning enables fast and efficient transfer of digitized teaching material, reduces costs, as well as the time required for students to find the content necessary for independent learning (Chen & Teseng, 2012, p. 399). Modern learning platforms developed by well-known software companies offer multi-level and fully integrated distance education, as well as interactive communication opportunities (Chang, 2013, p. 42). The great advantage of e-learning is reflected in flexibility and accessibility (Al-Azawei, Parslow & Lundqvist, 2017, p. 1). In addition, e-learning leads students to independent learning, at the same time giving them the opportunity to save the conversation and listen to it later (Salamat, Ahmad, Bakht & Saifi, 2018, p. 5). It increases the effectiveness of knowledge and skills by enabling access to a massive amount of data, and enhances collaboration, and also strengthens learning sustaining relationships (Maatuk, Elberkawi, Aljawarneh, Rashaideh & Alharbi, 2021). However, Lee, Yoon and Lee (2009, p. 1321) cite certain limitations of e-learning. E-learning generally requires new pedagogical skills, discipline, as well as student motivation. In addition, there are certain security issues (cyber-attacks and hacking of e-learning systems). One of the challenges is the authentication of students who take the exam. Butnaru, Niță, Anichiti and Brînză (2021, p. 2) point out the lack of interactivity compared to

classroom learning, technical problems, poor internet connection, lack of socialization that can lead to anxiety and depression of students as shortcomings of online learning.

1.2. Technology Acceptance Model (TAM)

Davis et al. (1989) develop the Technology Acceptance Model (TAM) to examine the effects of technology on user behavior. In this model, perceived usefulness and perceived ease of use are two key variables that affect the user's attitude towards the use of a particular technology, and attitude is an important predictor of the intention to use the technology. In addition to the above, it is assumed that the perceived ease of use affects the perceived usefulness. Perceived usefulness is defined as the potential user's subjective feeling that using a particular application system will increase his or her performance, and perceived ease of use refers to the degree to which a user believes that he or she will use a particular system effortlessly (Davis et al., 1989, p. 985). Numerous studies apply the TAM model in the field of education in order to examine the readiness of students to accept e-learning systems (Liu, Chen, Sun, Wible & Kuo, 2010; Sukendro et al., 2020; Ibrahim et al., 2017; Cheung & Vogel, 2013). Ratna and Mehra (2015) point out that TAM enables the analysis of the reasons for resistance to technology, as well as the taking of effective measures for better acceptance of e-learning by users. Therefore, the TAM model represents the scientific basis for this research. In addition to the original TAM variables (perceived usefulness, perceived ease of use, attitude towards technology, intention to use technology), research model includes three other variables (course design, quality of e-learning and satisfaction with online teaching).

1.3. Research model and hypotheses

Designing online learning refers to selecting components that help improve student learning and enable students to access course content (Lister, 2014). Good design plays an important role in attracting and retaining consumer interest in a website (Ranganathan & Ganapathy, 2002). Liu et al. (2010) find that online course design is a key factor in the success or failure of online learning. They emphasize design as the most important predictor of perceived usefulness, because the more satisfied users are with the online curriculum, the more useful the online course will be. The design of online courses should meet the needs of

participants at different levels and provide students with easy access to learning materials (Cheng, 2012). If appropriate content is posted and updated in a timely manner, users will find the e-learning portal a useful learning tool (Lee et al., 2009). Course designers must carefully consider their structure when designing e-learning courses (Lister, 2014). Distance learning is much easier for students if the e-learning course is well structured and has an attractive design that is in line with student competencies (Elumalai et al., 2020). Many studies conclude that e-learning course design has significant effects on perceived usefulness and perceived ease of use (Liu et al., 2010; Lee et al., 2009). In addition, Elumalai et al (2020) find that course design is an important predictor of e-learning quality. Having in mind the above, the following hypotheses are formulated:

H1a: Course design has statistically significant effects on perceived usefulness.

H1b: Course design has statistically significant effects on perceived ease of use.

H1c: Course design has statistically significant effects on the quality of e-learning.

For the purposes of this research, perceived usefulness can be described as the degree to which students believe that the use of e-learning during the COVID-19 pandemic improved their learning effects. Perceived ease of use refers to students' perception that the use of e-learning technology during the COVID-19 pandemic does not require much effort. Siron, Wibowo and Narmaditya (2020) find that perceived usefulness and perceived ease of use positively influence the intent to use e-learning during the COVID-19 pandemic.

Malathi and Rohani (2011) investigate the use of e-books by students from Malaysia. They point out the connection between perceived ease of use and perceived usefulness, as well as the effects of perceived usefulness on the attitude and intention of using e-books. Thus, technology will only be accepted if it offers potential customers a unique advantage over existing solutions (Rogers, 1995). Ratna and Mehra (2015) examine the acceptance of e-learning technology on the example of students from India and conclude that perceived usefulness has positive effects on attitude, as well as that perceived ease of use has positive effects on perceived usefulness and attitude towards the use of e-learning. If users find e-learning easy to use, then they will feel it is useful and will be willing to use it (Liu et al., 2010). Given previous studies that show a statistically significant impact of perceived

usefulness and perceived ease of use on attitudes toward the use of e-learning (Jović, Kostić Stanković & Nešković, 2017; Mailizar, Almanthari & Maulina, 2021; Ratna & Mehra, 2015; Cheung & Vogel, 2013), as well as the effects of perceived ease of use on perceived usefulness (Nikou & Maslov, 2021; Siron et al., 2020; Cheng, 2012; Mailizar et al., 2021; Mohammadi, 2015; Chen & Tseng, 2012), the following hypotheses are formulated:

H2a: Perceived usefulness has statistically significant effects on attitudes towards the use of e-learning.

H2b: Perceived ease of use has statistically significant effects on attitudes towards the use of e-learning.

H2c: Perceived ease of use has statistically significant effects on perceived usefulness.

Students' acceptance of online learning technology can significantly affect student satisfaction (Lee, 2010). Drennan et al. (2005) conclude that perceived usefulness is an important predictor of satisfaction. E-learning users will not be satisfied if they find the technology difficult to use or if it does not help them improve their learning performance (Al-Azawei et al., 2017). Research states that perceived usefulness and perceived ease of use have significant effects on student satisfaction (Al-Azawei et al., 2017; Sun et al., 2008). If e-learning is easy to use and students access online teaching easily, then they will be able to devote more time to learning itself, instead of investing extra effort and time to master the use of technology (Sun et al., 2008). Based on the above, the following hypotheses are formulated:

H3a: Perceived usefulness has statistically significant effects on student satisfaction with online teaching.

H3b: Perceived ease of use has statistically significant effects on student satisfaction with online teaching.

In the field of higher education, service quality is defined as the difference between students' expectations and their experience with higher education services (Stodnick & Rogers, 2008). The quality of e-learning services has a positive effect on student satisfaction, which in turn has a positive effect on the loyalty of e-learning users (Pham et al., 2019). In order to monitor student satisfaction in online education, it is important to evaluate the quality of technology, support services and course design (Rovai, 2003). Quality of service, quality of content, quality of systems are important factors for assessing the satisfaction of students who use e-

learning (Ozkan & Koseler, 2009). In the context of e-learning, the quality of service has a significant positive impact on student satisfaction (Chang, 2013; Poulova & Simonova, 2014). Students will embrace e-learning and will be satisfied if there is a high-quality e-learning service (Lee, 2010). Lee et al. (2009) state that students will be more positive toward e-learning with the improvement of its quality. With this in mind, the following hypothesis will be tested:

H4: The quality of e-learning has statistically significant effects on student satisfaction with online teaching.

Satisfaction is defined as meeting consumer expectations about the performance of products and services (Oliver, 1980). If the performance of products/services exceeds consumer expectations, a high degree of satisfaction is achieved. Satisfaction is an important determinant of information system success (Rai, Lang & Welker, 2002). Pham et al. (2019) state that in the era of ICT development, online satisfaction can be defined as the overall user assessment of the quality of products or services offered on the online market. In this regard, they point out that students are viewed as consumers and that student satisfaction is one of the most important university goals. In this study, satisfaction is seen as meeting consumer expectations about how to teach online during the COVID 19 pandemic. Satisfaction is related to students' experience in using e-learning (Richardson, 2017) and is an important predictor of e-learning intent (Chang, 2013; Mohammadi, 2015; Liaw, 2008; Al-Rahmi et al., 2018). In addition to the effect on intended use, a positive experience can also positively affect student attitudes (De Vos, Singleton & Gärling, 2021). So, if students are satisfied with online teaching, they will continue to use e-learning. On the other hand, if there is no satisfaction, students will have a negative attitude towards e-learning and will reduce or stop using it altogether. Therefore, it is very important to examine the satisfaction of students with online teaching. In this regard, the following hypotheses have been formulated:

H5a: Satisfaction with online teaching has a statistically significant impact on attitudes towards e-learning.

H5b: Satisfaction with online teaching has a statistically significant impact on the intention to use e-learning.

In this study, the attitude refers to the opinion of students about the use of e-learning during the Covid-19 pandemic. Users of e-learning

technology tend to follow certain behaviours based on their positive attitude towards that technology (Keong, Albadry & Raad, 2014). Numerous studies find that attitude is an important predictor of the intention to use e-learning (Mailizar et al., 2021; Ratna & Mehra, 2015; Sukendro et al., 2020; Cheung & Vogel, 2013; Cicha, Rizun, Rutecka & Strzelecki, 2021). Thus, a positive attitude towards

e-learning increases the likelihood of its actual use by students. In this regard, the following hypothesis will be tested:

H6: Attitudes towards the use of e-learning have a statistically significant impact on the intention to use e-learning.

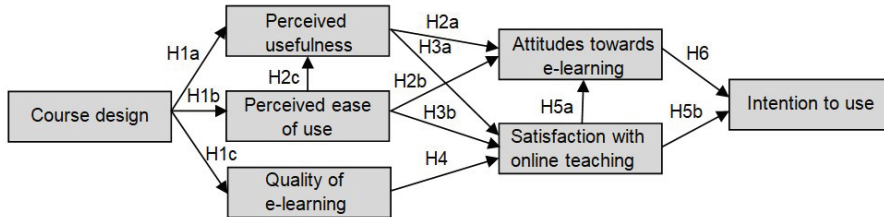The research model is shown in Figure 1.

Figure 1 The research model
Source: the authors

2. Research methodology

Empirical research uses a survey method to collect primary data. The questionnaire is distributed to students on the territory of the Republic of Serbia who use e-learning, and 312 respondents answer the questions. Female respondents dominate the sample, 192 of them or 61.5%, while men make up 38.5% of the sample (120 respondents). First-year students make up 23.7% of the sample (74 respondents), second-year students 29.8% (93 respondents), then 54 respondents attend the third year (17.3%), 57 fourth (18.3%), and 10 respondents attend the fifth year (3.20%). Master students make up 6.40% of the sample (20 respondents) and 1.30% are doctoral students (4 respondents). The sample structure is shown in Table 1.

In addition to these two demographic questions, the questionnaire also contains 22 items scaled on a seven-point Likert scale, with which respondents expressed their degree of agreement (1 – I strongly disagree: 7 – I strongly agree). The design of the e-learning portal is measured through 4 items (Ibrahim et al., 2017), the perceived usefulness includes 4 items (Sukendro et al., 2020; Thapa, Bhandari & Pathak, 2021), and 4 items make up the perceived ease of use (Ibrahim et al, 2017). The quality of e-learning is observed through 3 items (Elumalai et al., 2020), attitude to the use of e-learning using 2 (Malkavi, Bawaneh & Bawaneh, 2021; Ratna & Mehra, 2015), satisfaction with online teaching using 3 (Mohammadi, 2015; Sun et al., 2008), and the intention to use it with 2 items (Sukendro et al., 2020).

Table 1 Sample structure

		Number of respondents	%
Gender	Female	192	61.5
	Male	120	38.5
Year of study	I	74	23.7
	II	93	29.8
	III	54	17.3
	IV	57	18.3
	V	10	3.2
	Master studies	20	6.4
	PhD studies	4	1.3
	Total	312	

Source: the authors

The data analysis is performed in the statistical packages for social sciences IBM SPSS 20 and IBM AMOS 23. The SPSS program is used to conduct a reliability analysis to determine the internal consistency of the formed variables. With the help of the AMOS program, the validity of the research model is tested using confirmatory factor analysis (CFA), and then a structural equation model is used to test the effects of independent on dependent variables.

3. Research results

3.1. Model reliability and validity analysis

In order to determine the internal consistency of the variables that make up the research model, a reliability analysis is conducted. The results are shown in Table 2.

Table 2   Reliability analysis

Variables	Cronbach' alpha
Course design	0.828
Perceived usefulness	0.885
Perceived ease of use	0.893
Quality of e-learning	0.872
Attitudes towards e-learning	0.849
Satisfaction with online teaching	0.956
Intention to use	0.952

Source: the authors

Since the value of the Cronbach's alpha coefficient for each formed variable is higher than the lowest required value of 0.7 proposed by Nunnally (1978), it can be concluded that all variables have the appropriate internal consistency of the items that make them, i.e. that all variables are reliable.

Table 3   Model-fit indices

Fit indices	Value in the model	Recommended value
x^2/df	2.59	<3
CFI	0.952	>0.9
TLI	0.941	>0.9
IFI	0.953	>0.9
RMSEA	0.072	<0.08

Source: the authors

In order to test the validity of the model, a confirmatory factor analysis is conducted. Values of CFI (Comparative Fit Index), TLI (Tucker-Lewis Index) and IFI (Incremental Fit Index) higher than 0.9 (Byrne, 1998), RMSEA (Root Mean Square Error of Approximation) lower than 0.08 (Hair, Black, Babin & Anderson 2010), and x^2/df ratio lower than 3 (Carmines & McIver, 1981) indicate that there is an acceptable model fit (Table 3). The results of the confirmatory factor analysis also indicate the convergent validity of the model, since the AVE values of all variables are greater than 0.5 (Fornell & Larcker, 1981). In addition, CR values (Composite Reliability) in all variables are higher than 0.6, as recommended by Bagozzi and Yi (1988). The results are shown in Table 4.

Table 4   Composite reliability (CR) and Average variance extracted (AVE)

Variables	CR	AVE
Course design	0.828	0.547
Perceived usefulness	0.886	0.661
Perceived ease of use	0.903	0.702
Quality of e-learning	0.875	0.701
Attitudes towards e-learning	0.863	0.761
Satisfaction with online teaching	0.957	0.882
Intention to use	0.953	0,909

Source: the authors

3.2. Testing the hypotheses

In order to test the set hypotheses, a model of structural equations is used. Twelve influences are tested, and 10 prove to be statistically significant.

Table 5   Hypothesized relationships

Hypotheses	β	p
H1a: Course design → Perceived usefulness	0.338	0.026**
H1b: Course design → Perceived ease of use	0.872	0.000***
H1c: Course design → Quality of e-learning	0.767	0.000***
H2a: Perceived usefulness → Attitudes towards e-learning	0.671	0.000***
H2b: Perceived ease of use → Attitudes towards e-learning	-0.225	0.000***
H2c: Perceived ease of use → Perceived usefulness	0.413	0.004***
H3a: Perceived usefulness → Satisfaction with online teaching	0.427	0.000***
H3b: Perceived ease of use → Satisfaction with online teaching	0.029	0.660
H4: Quality of e-learning → Satisfaction with online teaching	0.458	0.000***
H5a: Satisfaction with online teaching → Attitudes towards e-learning	0.479	0.000***
H5b: Satisfaction with online teaching → Intention to use	0.088	0.440
H6: Attitudes towards e-learning → Intention to use	0.767	0.000***

*** Significant at a 0.01 level.
** Significant at a 0.05 level.
Source: the authors

The analysis shows that course design has a statistically significant impact on perceived usefulness (β = 0.338, p <0.05), perceived ease of use (β = 0.872, p <0.01) and e-learning quality (β = 0.767, p <0.01), which confirms the hypotheses H1a, H1b and H1c (Table 5). Then, it finds that perceived usefulness (β = 0.671, p <0.01) and perceived ease of use (β = -0.225, p <0.01) have statistically significant effects on attitudes towards the use of e-learning, as well as that perceived ease of use significantly affects the perceived usefulness (β = 0.413, p <0.01), which proves the hypotheses H2a, H2b and H2c.

Hypothesis H3a is also confirmed, having in mind the statistically significant effects of perceived usefulness on satisfaction with online teaching (β = 0.427, p <0.01). On the other hand, hypothesis H3b is rejected, since the perceived ease of use does not have a statistically significant effect on satisfaction with online teaching. The quality of e-learning has statistically significant positive effects on satisfaction with online teaching (β = 0.458, p <0.01), which confirms hypothesis H4. Hypothesis H5a is also accepted, due to the

statistically significant influence of satisfaction with online teaching on the attitude towards the use of e-learning (β = 0.479, p <0.01). However, hypothesis H5b is not accepted due to the lack of a statistically significant effect of online teaching satisfaction on intention to use. Finally, it is found that the attitude towards the use of e-learning has a statistically significant impact on the intention to use (β = 0.767, p <0.01), which confirms hypothesis H6.

4. Discussion of results

The analysis shows that course design has statistically significant positive effects on both TAM dimensions (perceived usefulness and perceived ease of use), which is consistent with a number of studies (Liu et al., 2010; Lee et al., 2009). The strongest influence of the course design is on the perceived ease of use. So, if the e-learning course is designed in an appropriate way, students will consider e-learning technology easy and simple to use, i.e. the course design depends on how much effort it takes students to master the use of e-learning. Also, a well-structured and designed e-learning course will help students improve their learning effects. In addition to the above, it is found that the design of the course is a very strong predictor of the quality of e-learning. Elumalai et al. (2020) reach a similar conclusion. Visually appealing design, timely uploaded and updated materials and, appropriate and easy navigation through the e-learning portal can contribute to improving the quality of online teaching.

In accordance with previous studies (Jović et al., 2017; Mailizar et al., 2021; Ratna & Mehra, 2015), this research finds that perceived usefulness has statistically significant positive effects on attitudes toward the use of e-learning. So, if students think that e-learning helps them master the material more easily, as well as in achieving better learning performance, they will have a more favourable attitude towards it. On the other hand, the analysis shows that the perceived ease of use has negative effects on the attitude towards the use of e-learning. In the context of the COVID 19 pandemic, educational institutions were forced to use online teaching instead of traditional teaching. In such circumstances, students may feel that due to the simplicity of using e-learning, online teaching will not be at the same level as traditional, and therefore there may be a negative impact of perceived ease of use on the attitude towards e-learning. Then, it is found that the perceived ease of use has a significant positive impact on the

perceived usefulness. A large number of other studies reach identical conclusion (Nikou & Maslov, 2021; Siron et al., 2020; Cheng, 2012; Mailizar et al., 2021; Mohammadi, 2015; Chen & Tseng, 2012). So, the easier e-learning is to use, the more useful students find it.

Perceived usefulness is an important predictor of student satisfaction with online teaching, which is in line with previous studies (Al-Azawei et al., 2017; Sun et al., 2008; Drennan et al., 2005; Al-Fraihat, Joy, Masa'deh & Sinclair, 2019). If students perceive e-learning as useful, i.e. it helps them master the material faster, easier and better, thanks to accessibility and availability at any time and in any place, a higher level of their satisfaction will be achieved with this way of teaching. On the other hand, in a study by Drennan et al. (2005), it is found that perceived ease of use has no significant impact on satisfaction. This can be explained by the fact that students mostly belong to the younger population, which is generally skilled and experienced in the use of technology. The mere fact that the technology is easy to use does not give students much satisfaction. In order to achieve a higher level of satisfaction, it is much more important that the use of e-learning and the online classes they attend are useful than easy to use. Then, it is shown that the quality of e-learning can significantly affect student satisfaction, which is in line with the conclusions reached by Pham et al. (2019), Lee (2010), Liaw (2008), Sun et al. (2008), Chang (2013), Poulova and Simonova (2014). If e-learning is adapted to students, enables them to raise the level of their achievements and provides timely feedback, as well as everything else they need to successfully master the subject matter, students are satisfied with this way of teaching.

This study concludes that student satisfaction with online teaching has significant positive effects on attitudes toward the use of e-learning. De Vos et al. (2021) come to the conclusion about the influence of satisfaction on attitude. However, satisfaction with online teaching has been found to have no impact on the intention to use e-learning, which differs from the conclusions of previous studies (Chang, 2013; Mohammadi, 2015; Liaw, 2008; Al-Rahmi et al., 2018). If online teaching meets or exceeds students' expectations, i.e. a high degree of satisfaction is achieved with the way online teaching is realized, there will be a more favourable attitude and positive opinion of students towards e-learning. However, the fact that students are satisfied with online teaching does not necessarily mean that it has a decisive influence on

their intention to use e-learning. In the conditions of the pandemic, students used e-learning not only because they were satisfied with it, but also because they were forced to do so. Due to the prescribed measures and quarantines during the COVID-19 pandemic, many educational institutions partially or completely switched to online teaching, so that students had no choice but to use e-learning, whether they were satisfied with online teaching or not. Finally, attitude has been found to be an important predictor of intention to use e-learning, as confirmed by other studies (Mailizar et al., 2021; Ratna & Mehra, 2015; Sukendro et al., 2020). So, if students have a more positive attitude towards the use of e-learning during the COVID-19 pandemic, they are more likely to accept and use it.

Conclusion

The current epidemiological situation caused by the COVID-19 virus pandemic has led to an increase in the number of e-learning users, which is why the importance of research in this area is emphasized. In this regard, the purpose of this study is to examine the key factors influencing the intention of students to use e-learning, as well as predictors of student satisfaction with online teaching during the COVID-19 pandemic. It is found that course design significantly affects perceived usefulness, perceived ease of use and quality of e-learning, and perceived usefulness and quality of e-learning are the main drivers of student satisfaction. Then, perceived usefulness, perceived ease of use and satisfaction with online teaching are important predictors of the attitude towards the use of e-learning, and attitude is an important driver of the intention to use e-learning.

This research is expected to contribute to the literature in the field, spreading knowledge about key predictors of e-learning technology acceptance, as well as factors influencing student satisfaction with online teaching during the COVID-19 pandemic. Scientific contribution of this paper lies in a unique structure of a research model with scientific bases (Davis et al., 1989). Based on TAM, this study integrated satisfaction with online teaching with the adoption of e-learning technology, thus extending the original TAM model. Most research related to e-learning used users' attitudes towards e-learning technology and/or the intention to use e-learning as dependent variables, and a smaller number of authors found a dependent variable in satisfaction with online teaching itself, which is an additional contribution

of this research. Although a large number of studies have examined e-learning, the main research motivation is the study of e-learning in the specific conditions of the COVID-19 virus pandemic, which contributes to the originality of this paper.

Based on the results of the research, implications have been derived that can be of help to educational institutions in creating, introducing and implementing e-learning, as well as for increasing student satisfaction with online teaching during the pandemic. Due to the pronounced influences of the course design, it is important to pay special attention to it. Therefore, when creating a course, it is desirable to take care that it is not too complicated to use, that it has easy navigation and appropriate structure, and that it contains all the functionalities necessary for everyday use of e-learning by students and professors. In addition to the above, it is recommended to take into account the visual appearance of the user interface. Aesthetically appealing shapes, colours, as well as wallpaper can provide additional atmosphere to users. If the main obstacle for students to use e-learning is that the technology is complicated to use, it is recommended to conduct student training or make brochures and video instructions with a detailed explanation of how to use. In addition to training for students, it is desirable to conduct training for teachers, in order to better master the use of e-learning technology and thus improve the quality of online teaching they perform. If there is resistance of a certain number of students to the acceptance of e-learning technology, it is recommended to point out to students in cooperation with the student parliament all the benefits of e-learning, such as flexibility, saving time and avoiding physical contact, which is desirable during the COVID-19 pandemic.

It is of special importance that the courses are updated in a timely manner and appropriate materials are set up that will satisfy the educational needs of students. This is especially important in a pandemic, given that many students were infected or forced into isolation at some point, and, therefore, could not attend classes in educational buildings. In such situations, the only option for students is to follow online classes. Given that online teaching is characterized by a lack of interactivity compared to traditional teaching, it is important for students to be provided with all necessary feedback in a timely manner, rather than reducing online teaching to posting material on the portal. In addition to the above, online teaching is characterized by a lack of socialization and

pronounced individual in relation to teamwork. In this regard, it is desirable that students have more tasks and projects that require teamwork and cooperation with other students, and thus alleviate these shortcomings of online teaching. In this way, students will be more motivated and satisfied with online teaching, which will lead to more favourable attitudes towards the use of e-learning technology. It is also recommended that higher education institutions conduct a survey of their students in order to collect data on their opinions related to e-learning technology and online teaching and thus assess their overall satisfaction. In that way, the analysis of the obtained data will determine the existence of possible problems and allow taking appropriate measures in time.

The research conducted has several limitations. First, only students were examined in the study; the professors' opinion was not taken into account. Second, the research was conducted on the territory of the Republic of Serbia, so the results cannot be generalized. Third, the possible bias of the respondents in giving answers can lead to wrong conclusions. The recommendation for future research is to examine the attitudes of professors who use e-learning, in addition to students. Another recommendation is to do a segment analysis (by gender, year of study) in order to develop specific strategies for each segment. Another suggestion is to compare students' opinions on e-learning and traditional ways of learning.

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