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Students' Behavioural Intention Regarding E-Learning During the COVID-19 Pandemic

Isidora Milošević[1], Jelena Ruso[2], Ana Rakić[2], Sanela Arsić[1] and Đorđe Nikolić[1]
[1]*University of Belgrade, Technical Faculty in Bor*
[2]*University of Belgrade, Faculty of Organizational Sciences*

Abstract

Due to the appearance of COVID-19, the newly emerged situation has provoked numerous reactions in the field of education, both in the world and in Serbia. Prompted by this problem, the authors of this paper conducted a survey to determine students' behavioural intention, as well as their readiness to use e-learning during the COVID-19 pandemic. E-learning has integrated technology and education and has proven to be a powerful tool that enables the education system to respond to the challenges of modern society. In this research, an online questionnaire was distributed to the students of the University of Belgrade. To process the results, the SEM methodology was employed, which enabled the testing of the proposed hypotheses. The obtained results showed the students' behavioural intention can be directly and indirectly predicted by the joint influence of the role of authority, innovative orientation, user-friendly learning, expected performance, and quality of e-learning. This knowledge enabled a comprehensive analysis that encompassed the e-learning experiences students gained during a state of emergency.

Key words*: COVID-19; e-learning; higher education; students' behavioural intention; modelling.*

Introduction

Since 2019 the pandemic of the coronavirus has been present in a considerable number of countries (Lipsitch et al., 2020). Hand in hand with the economic crisis and as the consequence of the problems caused by this phenomenon, education has not been immune to this global problem that has led to the complete closure of faculties and universities. According to UNESCO monitoring (www.en.unesco.org),

189 states have implemented countrywide closures, and five have implemented local closing, which influences around 98.4 % of the student population worldwide. This situation has forced education systems worldwide to adapt their teaching systems to electronic distance learning systems. It means that "severe reduction in the number and type of face-to-face learning sessions" has had to occur (Evans et al., 2020, p. 4) and a students' guide designed for online courses has had to be created. This new drive to move to digital education offers educational institutions the chance to review their future approach to this process.

The permanent development of information technology (IT) always imposes new challenges on society to adapt, learn, and improve (Mitić et al., 2017). In the world of education, the use of information and communication technology (ICT) has enabled the creation of new pedagogical practices and provided the creation of several distance learning modalities, including blended learning, thus facilitating the establishment of virtual universities. However, the education system faces challenges to meet the expectations of so-called "digital" students because they have a different mindset, interaction and communication, and expectations concerning the education system.

Before the outbreak of the new pandemic, teaching platforms for online learning were widely adopted by education institutions (Uppal & Gulliver, 2018). Therefore, different devices and software have become popular learning "toys" among students (Nikou & Economides, 2017). The VLE, Moodle, and Zoom have been considered the most popular digital platforms in learning (Horvat et al., 2015; Chua & Chua, 2017; Dharma et al., 2017; Sharma et al. 2017; Rawat and Dwivedi, 2019). However, despite technological innovation and investment in education, E-learning as a new approach is not gaining popularity in developing countries (Farid et al., 2015). For instance, in budget allocations, Kenyan universities do not prioritise E-learning (Vershitskaya et al., 2020). Due to poor educational infrastructure, lack of skilled lecturers, sophisticated knowledge, technology access, personal problems, relationship inhibitors, and contextual inhibitors (Qureshi et al., 2012; Teo & Milutinovic, 2015; Zamani & Esfijani, 2016), methods of managing information technologies are not always suitable for third world countries (Mitić et al., 2017). However, this pandemic does not ask whether one is ready, or whether one wants, or can quickly adapt to rapid changes, including the compulsory use of IT technology. It is no longer a matter of choice. It is a must.

Serbia is a developing country located at the crossroads of Central and South-Eastern Europe, where the Distance Learning System (DLS) has evolved significantly over the last few years. The number of colleges and universities that introduce distance learning programs in the accreditation process has been gradually increasing. Nevertheless, according to the National Entity for Accreditation and Quality Assurance in Higher Education of Serbia (NEAQA) (www.nat.rs), DLS in Serbia's higher education is not present to a significant extent. Based on the NEAQA data report, only 67 study programs are currently accredited for distance learning.

The motive for this research is the new situation that disabled the teaching process at universities, which was regularly performed before the COVID-19 situation. Specifically, universities had to react immediately to the sudden changes caused by the COVID-19 pandemic. They also had problems continuing their regular classes providing the same quality level. The main issue was how to improve communication between lecturers and students. Although several studies examined the e-learning system during the pandemic disruption (Almaiah et al., 2020), there is still a gap in the literature regarding the impact of factors on students' behavioural intention to use e-learning during the COVID-19 outbreak (Shahzad et al., 2020). Therefore, this study strives to bridge this knowledge gap by investigating those relationships in such circumstances in a developing country. The aim of this study is to investigate the predictors of students' behavioural intention for using e-learning in emergency situations.

Literature review

In a technology-driven world, the increasing use of communication technology in education has emerged as a crucial aspect of the COVID-19 period (Vrbik et al., 2021). A fascinating analogy that should be mentioned here is the relationship between the ancient Areopagus and e-learning and the "classroom", in terms of equal involvement of each participant (lecturers and students) in every topic on a specific "electronic Areopagus".

The development of information technology has progressed rapidly in education, soon replacing traditional methods of education by methods of education using technological devices. This technological advancement in education is known as e-learning (Keegan, 2001). However, the development of mobile technologies and the significance of using technology in education has revealed a new term, m-learning. „E-learning is learning supported by digital electronic tools and media and m-learning is the e-learning using mobile devices and wireless transmission" (Kumar Basak et al., 2018). However, a literature review has shown that the concept of e-learning has indeed attained much interest among researchers (Table 1). The e-learning evolution has produced the need for innovative applications and platforms for supporting the teaching and learning processes.

The literature review has revealed the importance of the dimension of students' behavioural intention. According to Chu and Chen (2016, p. 38), behavioural intention is defined as an individual's willingness to complete a specific behaviour or "state of student's readiness" in the e-learning process (Hanif et al., 2018). It also refers to the acceptance and adoption of new technologies to exploit them in the future learning process (Sánchez-Prieto et al., 2017). Theorists and scholars assure that behavioural intention is a crucial factor in the use of information systems, which is best explained through the prism of the theory of planned behaviour (TPB/TRA) and the technology acceptance model (TAM) (Shiau & Chau, 2016).

Table 1
Summary of past studies about using e-learning by students

SN.	Year	Author	Purpose/Objective
1	2020	Vershitskaya, E. R., Mikhaylova, A. V., Gilmanshina, S. I., Dorozhkin, E. M., Epaneshnikov, V. V.	Evaluation of the readiness of university management and students for active e-learning
2	2019	Rodrigues, H., Almeida, F., Figueiredo, V., Lopes, S.L.	Focusing on e-learning and education activities as a self-oriented tool for electronic learning for all educational fields and educational systems covering different training needs and students.
3	2019	Wang, L.Y. K., Lew, S. L, Lau, S.H., Leow, M.C	Identifying five usability indicators for factor analysis.
4	2019	Vasconcelos, P., Furtado, E., Pinheiro, P.	Describing how the MPS-USE strategy was applied in a university setting to evaluate the configuration of an online course
5	2019	Revythi, A., Tselios, N	Examining the acceptance of technology and behavioural intention to use learning management systems
6	2019	Matute-Vallejo, J., Melero-Polo	Predicting the degree of acceptance of an online business simulation game in an educational context
7	2018	Salloum, S. A., Al-Emran, M., Shaalan, K., Tarhini, A	Studying the factors that affect university students' acceptance of e-learning systems
8	2018	Ameen, N., Willis, R., Abdullah, M. N., Shah, M.	Analysing the factors that can explain the adoption and effective use of a new e-learning system in Iraq
9	2017	Chang, C. T., Hajiyev, J., Su, C.R	Determining the factors that affect undergraduate students' behavioural intention to use an e-learning system
10	2015	Milošević, I., Živković, D., Manasijević, D., Nikolić, D.	Presenting the results of research in the application of new technologies in higher education with particular emphasis on m-learning.

When considering e-learning, a significant relationship between students' behavioural intention and perceived ease of use, as well as behavioural intention and perceived usefulness was noticed by Chang et al. (2017), Nikou & Economides (2017), and Ameen et al. (2019). Revythi & Tselios (2019) examined students' behavioural intention to use learning management systems. They found that it was affected by perceived usefulness, system access, social norm, attitude to eClass, and self-efficacy. Some authors show that knowledge acquisition (knowledge acquired through e-learning) is a prominent predictor of behavioural intention to use digital technology (García-Sánchez, 2017; Al-Emran & Teo, 2019). Furthermore, Briz-Ponce et al. (2017) surveyed medical students to discover their perception of mobile learning and the impacting factors of students' behaviour.

They concluded that social influence and reliability of recommendation significantly affected attitude and the behavioural intention to use m-learning. Additionally, Abu-Al-Aish & Love (2013), Sabah (2016), and Milošević et al. (2015) came to the findings that the quality of e-learning has a positive effect on students' behavioural intention. Therefore, as research to date suggests, it was found out that there are no standardised indicators that can influence individuals' behaviours in the context of distance learning.

In order to better understand the factors that will be discussed in the following section, definitions for each of them are specified:

– *The role of authority* – the teacher's essential role in actionable supporting, encouraging, influencing, and intervention helps students accept e-learning easily and smoothly (Gil-Madrona et al., 2020; Herodotou et al., 2019).

– *User-friendly learning* – the degree to which the learners believe particular e-learning would be free of effort (Al-Emran & Teo, 2019; Estriegana et al., 2019).

– *Innovative orientation* – learners' "intention to explore novel ideas and solutions" (Law & Geng, 2019, p. 901) or positive attitudes towards new technology use (Ayub et al., 2017).

– *Performance expectancy* – the degree to which individuals believe the e-learning systems will help them achieve a goal (Thongsri et al., 2019).

– *Quality of e-learning* – the co-production process between the learners and the learning environment to motivate, enable, and empower the learners (Al-Fraihat et al., 2019).

The role of authority (RA)

Students' intended behaviour in the utilisation of e-learning is under the significant impact of the role of authority. Furthermore, it should be borne in mind that IT application in education requires a constant re-examination of the role professors and universities have and the simplicity and adequacy of a distance learning platform (Rodrigues et al., 2019). Moreover, this innovation affects students' academic performance and students' and lecturers' abilities to cope with the new challenges (Rodrigues et al., 2019). Various studies in the literature suggest that students are often very well-grounded in IT, which is why the role of authority is essential for accepting e-learning innovations (Lu et al. 2005; Sim et al., 2012).

Besides, the effectiveness of e-learning can also be affected by students' individual characteristics such as motivation for studying, learning style, or prior knowledge (Venkatesh et al., 2003). Recommendations and attitudes of lecturers can considerably affect the acquisition of m-learning in students (Venkatesh et al., 2003). With this in mind, online education needs to be in line with students' requirements and characteristics to achieve their better motivation and engagement in e-learning (Ren et al., 2017). Most authors have concluded that to motivate students to use new technologies, lecturers must first accept and adapt to the introduction of new IT into education (Milošević et al., 2015). Based on prior research, the following hypothesis has been proposed:

H1. The role of authority (RA) positively affects students' innovative orientation (IO).

Innovative orientation (IO)

In the education process, innovative persons show the inclination to use new technologies (Özcan et al., 2016). Innovative orientation is a tendency or willingness of a person to experiment with or try out new ITs (Van Raaij & Schepers, 2008). Schillewaert et al. (2005) think that adaptation to new systems might disclose ease of use more quickly for innovative individuals than non-innovative ones. An innovative person enjoys keeping up with the cutting edge of technology in their domains (Robinson et al., 2005), and he/she plays a vital role in the acceptance of "e" or "m"-learning (Joo et al., 2014; Sharma et al., 2017).

Van Raaij & Schepers (2008) found a direct positive effect of personal innovativeness on the perceived ease of use of the system. In the research by Nikou & Economides (2017) the same statistical significance was not confirmed. Innovative orientation as a learner's characteristic is very significant in contributing to the behavioural intention for e-learning. In other words, the more open to trying new technologies students are, the higher the probability they will discover the usefulness of e-learning (Al-Busaidi, 2013). Recently, Ayub et al. (2017) examined factors that impact students' perception of using mobile applications in learning. They reported that one of the factors, such as personal innovativeness, influences students' attitudes towards using mobile apps. The same conclusion was reached by Matute-Vallejo & Melero-Polo (2019), who showed in an online business simulation game that, in the educational context, innovativeness would soon become one of the predictors of ease of use. Hence, the following hypothesis has been set:

H2. Student innovative orientation (IO) positively affects their user-friendly learning (UFL).

Furthermore, while investigating m-learning motivators, Karimi (2016) found that, in specific settings, the innovative orientation of a person and performance expectation are influential items. Similarly, Lu et al. (2005) and Kim & Park (2017) indicated individual innovativeness as a key factor determining expected performance. Further, Ngafeeson & Sun (2015) outlined the positive correlation between innovativeness and behavioural intention when exploring students' acceptance of e-textbooks, while Sharma et al. (2017) found a person's innovativeness to affect the continuous use of e-learning management systems such as Moodle. To study the factors affecting the acceptance of e-learning among university students, Salloum et al. (2018) revealed an insignificant effect of innovativeness on students' acceptance of e-learning. Existing literature has confirmed the impact of personal innovativeness on perceived expectations (Thakur & Srivastava, 2014). Finally, according to Milošević et al. (2015), personal innovativeness is found to have a direct influence on students' intended behaviour in m-learning. All of the above proves that innovative student orientation is an often explored and considered dimension in pedagogical literature. Hence, the following hypothesis has been put forward:

H3. Student innovative orientation (IO) positively affects their expected performance (EP).

User-friendly learning (UFL)

A user-friendly learning system positively influences students' desire to choose or use offered solutions (Salloum et al., 2018). User-friendly learning represents "the level to which the user believes that using a given system would be exempt from effort" or learning without hardship or heavy workload (Estriegana et al., 2019). Various studies have shown that users will be more prepared to become familiar with the features of a system and more willing to use it if the system is easy to use (Chiu & Wang, 2008, Hamid et al., 2016). Based on this, it is concluded that user-friendly learning is positively related to the desire to continue using it in an online environment (Chiu & Wang, 2008; Hamid et al., 2016). Therefore, it is reasonable to assume that the more comfortable an e-learning platform is to use, the more positive students' opinions about e-learning become (Estriegana et al., 2019). Accordingly, the following hypothesis has been developed:

H4. User-friendly learning (UFL) positively affects the quality of e-learning (QE).

Expected performance (EP)

In the literature, expected performance is recognised as an individual's awareness that using a particular system or platform will help achieve the desired goal (Venkatesh et al., 2003). The environment can positively or negatively affect an individual's abilities when it comes to endeavour in e-learning (Tsai et al., 2015). E-learning is beneficial for students because it advances performance, quality of learning, as well as their learning productivity (Wang et al., 2009). E-learning gives students the ability to complete their tasks quickly, while being in a comfortable ambience (Sabah, 2016). Furthermore, while the usefulness of basic IT is founded on a single person's performance, the effectiveness of the e-learning system relies deeply on the cooperation between lecturers and students (Islam, 2017). Students perceive e-learning as beneficial in cooperation with educators and colleagues (Sabah, 2016). Therefore, what significantly influences members of the academic community to adopt e-learning is expected performance (Gunasinghe et al., 2019). Accordingly, the following hypothesis has been proposed:

H5. Expected performance (EP) positively affects the quality of e-learning (QE).

Quality of e-learning (QE)

Perceived quality varies from person to person due to the subjective criterion usually defined as "fit for use" (Juran, 1981; Uppal & Gulliver, 2018). E-learning should provide an opportunity for students to interact and exploit available technologies and for lecturers to create and deliver teaching materials, set assignments, or communicate with student users (Vasconcelos et al., 2019). Therefore, determining the quality of

e-learning is crucial in order to produce the high quality of this service, which assures continuous service usage, and vice versa (Sharma et al., 2017). Al-Fraihat et al. (2019) defined quality of e-learning as " a process of co-production between the learner and the learning environment to enable and empower the learner". It has also been found that increasing service quality might ensure the students' satisfaction with e-learning (Al-Fraihat et al., 2019). In the e-learning environment, Liaw et al. (2007) compared a relationship between quality of e-learning and self-efficacy, perceived usefulness, and perceived enjoyment. The sixth hypothesis has been thus formulated as follows:

H6. Quality of e-learning (QE) positively affects the student behavioural intention to use e-learning (BIUE).

In this study, factors that influence behavioural intention to use e-learning in higher education in the COVID-19 period are proposed. Figure 1 illustrates the proposed research model, where BIUE (dependent variable) is proposed with one independent and four dependent predictors.

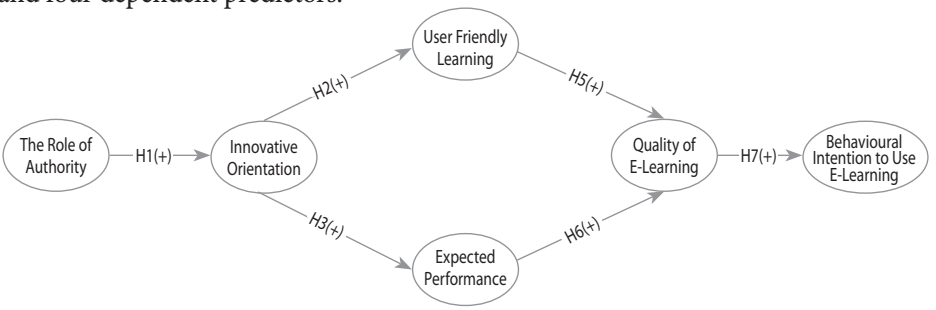

Figure 1. Conceptual model

Methodology

Data collection and sample size

In the new situation during the COVID-19 period, Serbia's entire education system has been forced to adapt its teaching system to electronic distance learning systems. The authors of this paper researched this topic in order to examine whether the teaching process in Serbia is flexible and capable of innovation in line with modern technology-supported trends. The University of Belgrade is the oldest and largest state university in Serbia, consisting of 31 accredited faculties (Savić et al., 2014; Lovren et al., 2020). Additionally, the University of Belgrade is internationally recognised as being among the first 500 best-ranked universities in the world on the Shanghai University "Cao Tun" list (www.shanghairanking.com).

A survey was conducted at the University of Belgrade at the very beginning of the state of emergency in Serbia (during March and April 2020). The collected quantitative data were calculated by means of the SPSS statistical software to answer the research questions and test their related hypotheses. The target respondents were students attending the University of Belgrade.

An online questionnaire was distributed and carried out using random sampling. Due to its simplicity to distribute and complete, the online survey method was selected as it could cover various questions about the subject being investigated and it provided a high level of information and interactivity (Ilieva et al., 2002; Cobanoglu & Cobanoglu, 2003). Moreover, the online questionnaire was seen as an important quantitative research method due to the high speed of collecting data and the low cost of its implementation (Vu & Hoffman, 2011; Nugroho et al., 2019). The questionnaire was conducted in only four weeks, and 1254 accurately completed responses were collected. Based on a survey by Ahmad & Love (2013) and Milošević et al. (2015), a modified questionnaire was created that served to test the set hypotheses. The questionnaire consisted of two parts. The first part presented the respondents' demographic information (gender, age, year of study, e-learning knowledge before the state of emergency and use of platforms for e-learning during the state of emergency). The second part of the survey measured respondents' behavioural intention to use e-learning (Appendix A). The survey consisted of 6 dimensions with 26 questions, and every question was measured by a 5-point Likert scale ranging from 1 to 5 (strongly disagree to strongly agree).

The students' behavioural intention to use e-learning in an emergency situation at the University of Belgrade was estimated using Confirmatory Factor Analysis (CFA). For the examination of proposed relationships, structural equation modelling was utilised, which encompassed two components: (1) a measurement model and (2) a structural model (Anderson & Gerbings, 1988). CFA was conducted to estimate discriminant and convergent validity, while path analysis was used to estimate path coefficients for the constructs. The gathered data were statistically analysed using SPSS v.20 and Amos v.20.0 software with the maximum likelihood method. This method estimated the goodness-of-fit model and tested the impacts of loadings and correlations between proposed constructs.

Data analysis and results

Demographic analysis

The demographic information about the respondents is presented in Table 2. It can be seen that the majority of the respondents were students between 22 and 25 years of age (51.4 %), who attended the fourth year of study (47.8 %). Regarding the knowledge of e-learning students possessed before the state of emergency, most of them indicated they had adequate prior knowledge about it (45.7 %). In terms of using platforms for e-learning before the COVID-19 period, answers were equally divided, with 52.6 % of students using platforms before the state of emergency, and 47.4 % not using e-learning platforms. In regards to the frequency of using e-services during the emergency, 80.6 % of the students indicated that they used e-services for learning 1-5 times per day. The results showed that two or more platforms were frequently used (54.5 %) during the COVID-19 pandemic.

Table 2
Characteristics of participants' demographic profiles

Characteristics		Percentage
Gender	Male	26.3
	Female	73.7
Age	18-21	45.2
	22-25	51.4
	26 and older	3.4
Year of Study	First Year	4.8
	Second Year	27.0
	Third Year	23.2
	Fourth Year	47.8
E-learning knowledge before the state of emergency	Little	37.8
	Good	45.7
	Very good	16.5
Did you use the platform for e-learning before the state of emergency?	Yes	52.6
	No	47.4
Frequency of using e-services during the state of emergency	N/A	6.2
	1–5 (times per day)	80.6
	6–10 (times per day)	12.2
	More than 10 times	1.0
What types of e-learning platforms did you use during emergency?	Moodle platform	3
	Microsoft Teams	38.9
	Zoom	2.4
	Cisco WebEx	0.2
	Learn digital with Google	1
	Combination of two or more platforms	54.5

Measurement model evaluation

In this article, confirmatory factor analysis was carried out to evaluate the reliability and validity of the measurement scale. Internal consistency reliability among indicators of each construct was performed. In this research, Cronbach's alpha method was employed to analyse whether a given predictor was independent of other predictors (Cronbach, 1951). The value of the reliability of every construct of the model is presented in Table 3. The results showed a high degree of reliability coefficient, where the value 0.70 or higher was considered acceptable (Sabah, 2016). Cronbach's Alpha for the model was very high at 0.928. The value of coefficients for most constructs exceeded 0.7 and exhibited strong reliability, except for one, whose value was 0.684, but according to Hair et al., (1995) this would be considered as acceptable.

Table 3
Confirmatory Factor Analysis of Behavioural Intention to Use E-learning

Construct	Items	Item loading	Composite reliability CR≥0.70	Average Variance Extracted AVE ≥0.50	Cronbach Alpha α≥0.70
The Role of Authority (RA)	RA_1 RA_2 RA_3	0.542 0.720 0.681	**0.687**	**0.425**	**0.684**
Innovative Orientation (IO)	IO_1 IO_2 IO_3	0.871 0.875 0.601	**0.832**	**0.628**	**0.816**
User-Friendly Learning (UFL)	UFL_1 UFL_2 UFL_3 UFL_4	0.721 0.601 0.821 0.715	**0.809**	**0.517**	**0.792**
Quality of E-learning (QE)	QE_1 QE_2 QE_3 QE_4 QE_5 QE_6	0.829 0.687 0.437 0.384 0.627 0.720	**0.791**	**0.402**	**0.736**
Expected Performance (EP)	EP_1 EP_2 EP_3 EP_4 EP_5	0.838 0.857 0.779 0.492 0.730	**0.862**	**0.564**	**0.868**
Behavioural Intention to Use E-learning (BIUE)	BIUE_1 BIUE_2 BIUE_3 BIUE_4 BIUE_5	0.659 0.771 0.672 0.884 0.908	**0.888**	**0.617**	**0.897**

Assessment of convergent and discriminant validity was conducted to examine the validity of the measurement instrument. Convergent validity was based on the correlation between items in the same factor. Accordingly, to assess the convergent validity of the model, standardised factor loadings of the observed variables, composite reliability, and average variance extracted values of each construct were used (Fornell & Larcker, 1981; Sabah, 2016; Zhu & Lin, 2019). Table 3 shows that standardised item loadings achieved convergent validity in the measurement instrument, according to Fornell & Larcker's (1981) criteria. Standardised item loading was significant if the value was above 0.5, CR was above 0.7, and AVE for each factor was above 0.5, which was regarded acceptable (Hair et al., 2017). It can be concluded that most constructs met the requirements for reliability and convergent validity at this stage. As an exception, AVE values of Role of Authority (AVE=0.425) and Quality of E-Learning (AVE=0.402)

were slightly lower than 0.50. However, according to Fornell & Larcker (1981), AVE can be accepted with a value higher than 0.4 if composite reliability is higher than 0.6. In this research, all composite reliability values were over 0.6, whereby the convergent validity of the constructs was still adequate.

Table 4 presents the values of the goodness-of -fit index and the proposed values utilised to appoint the measurement model. Typically, the good-fit-index is significant when the value of $\chi 2/df$ is equal to or less than 3 (Carmines Edward & McIver John, 1981). The recommended values of CFI, NFI, RFI, and IFI are equal to or greater than 0.90 (Carroll et al., 2002). According to Browne & Cudeck (1993), the TLI value is equal to or greater than 0.95, and RMSEA is less than or equal to 0.05. The proposed model met the recommended values of the goodness-of-fit index and indicated that the model is satisfying.

Table 4
Model fit indices for the measurement model

	χ^2 / df	CFI	RMSEA	NFI	RFI	IFI	TLI
Sample values	1.74	0.97	0.042	0.92	0.90	0.97	0.96
Recommended value	3.00	0.90	0.05	0.90	0.90	0.90	0.95

According to Fornell & Larcker's (1981) recommendation, the square root of AVE has to be higher than their cross-correlations between all constructs. Table 5 depicts that the square root of AVE of most constructs in a pair was higher than the correlation among the constructs, which confirmed their discriminant validity, except in the construct Quality of E-learning. The main reason for this was that the Confirmatory analysis resulted in the lower AVE values than the threshold of 0.5 (Table 5), therewith affecting the discriminant validity of the Quality of E-learning construct.

Table 5
A correlation matrix with discriminant validity and descriptive statistics

	Mean	S.D.	EP	UFL	RA	QE	IO	BIUE
Expected Performance (EP)	3.5	0.95	**0.750**					
User Friendly Learning (UFL)	4.11	0.75	0.422**	**0.719**				
The Role of Authority (RA)	4.05	0.77	0.493**	0.418**	**0.652**			
Quality of E-learning (QE)	3.87	0.63	0.650**	0.569**	0.633**	**0.634**		
Innovative Orientation (IO)	3.62	0.87	0.342**	0.326**	0.230**	0.351**	**0.826**	
Behavioural Intention to Use E-learning (BIUE)	3.55	0.94	0.686**	0.448**	0.357**	0.565**	0.471**	**0.785**

Note: Square root of average variance extracted (AVE) is reported on the diagonal for multi-item constructs with bold font.

**$p < 0.01$.

Structural model assessment and hypotheses testing

SEM (Structural Equation Modeling) was used to test and confirm the proposed hypotheses and define the level of the causal relationship between variables (Hair et al., 2010). The structural model obtained a good fit to the data (χ^2/df=1.71, CFI=0.97, RMSEA=0.041, NFI=0.93, RFI=0.91, IFI=0.97, and TLI=0.96). Table 6 shows the obtained results of SEM, which tested the proposed hypotheses. Calculated estimates in the structural model indicated that all established connections were confirmed as expected. Also, indirect relations among latent groups showed significant mediation effects between constructs.

Figure 2 shows the standardised regression coefficients of path analysis for the structural model, and the respective explained variances for the dependent constructs. "However, discussion of the results of the structural model is incomplete without consideration of indirect effects and the coefficients of determination (R^2) for each structural equation in the quantitative model" (Schreiber et al., 2006, p. 335). Thus, for this model, 33.1 % of the variation in BIUE was unexplained. Alternatively, 66.9 % of the variance was accounted for by the influences of the direct and indirect predictors of BIUE, which was highly acceptable in determining the linear relationship between the constructs. Furthermore, the results showed that RA explained 16.9 % of the IO variance, IO explained 17.6 % of the variance of UFL, IO explained 22.2 % of the variance of EP, while IO, UFL, and EP explained 92.6 % of the variance of QE. The coefficient of determination disclosed the influence of the latent constructs of using e-learning among the students that can be calculated with 43.2 % of the variance. It can be concluded that the obtained results depicted the amount of variance that each latent construct explained on each endogenous construct. Thus, R^2 values were higher than 0.16 for all constructs that showed that the structural model had predictive relevance (Q^2>0) (Estriegana, 2019)

Table 6
Results of path analysis

Hypothesis	Path	β coefficients	t - value	Support
H1	RA IO	0.411	5.658*	Accepted
H2	IO UFL	0.282	4.207*	Accepted
H3	IO EP	0.326	4.538*	Accepted
H4	UFL QE	0.226	4.770*	Accepted
H5	EP QE	0.810	9.115*	Accepted
H6	QE BIUE	0.755	13.906*	Accepted

Confirmed significant relationship between:
IOUFLQE estimated coefficient 0.071, p=0.000 (accepted indirect relationship)
IOEPQE estimated coefficient 0.295, p=0.001 (accepted indirect relationship)
*p < 0.01

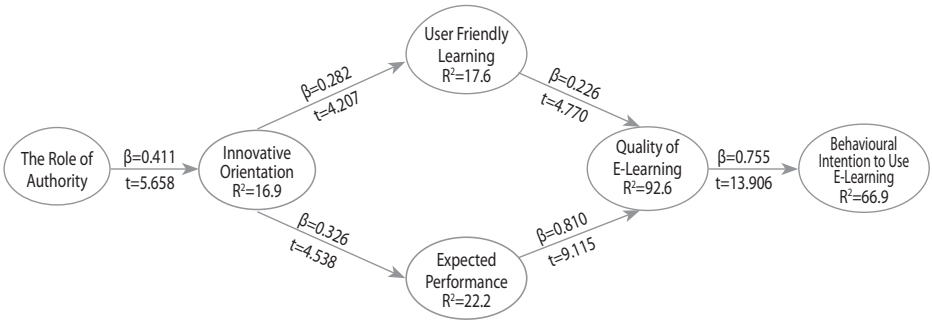

Figure 2. Structural model

Discussion

The newly emerged situation in the COVID-19 period disabled the regular teaching process at universities in Serbia. To overcome the gap between the teaching process in the time of the COVID-19 pandemic and student requirements, the universities had to react immediately to the sudden changes and continue their teaching processes with the same quality using e-learning platforms. Therefore, this study explores the predictors of students' behavioural intention to use e-learning in a state of emergency and the students' readiness to use e-learning utilising various platforms for distance learning.

SEM was utilised to explain students' behavioural intentions to use e-learning in emergency cases. By following other researchers' criteria regarding students' behavioural intentions to use e-learning, prior to the analysis five constructs were proposed to better understand the factors that affect the adoption of innovative, modern and technological trends in education. The obtained results have shown that the model completely met the required demands. The internal consistency reliability of each construct and values of composite reliability, discriminant and convergent validity were acceptable with a high level of statistical significance.

When measuring the reliability of the measurement scale, it can be seen that the predictor Behavioural Intention to Use E-learning had the highest value. That indicates that the instrument items were well selected for a construct that measures behavioural intention of students to use e-learning and they were consistent on different occasions. Also, the reliability of instrument items could be noticed in all other measurement constructs in the model. Convergent validity was achieved because the item factor loadings values were higher than 0.5, and the composite reliability and AVE values were higher than the recommended values. AVE estimates were also higher than the square of the correlation between the factors that proved discriminant validity.

This paragraph presents a summary of the results relating to six hypotheses. The findings of this study confirmed the positive effect of the role of authority (RO) on innovative orientation (IO) was at a 99 % confidence interval (β= 0.411, t=5.658, p<0.01). Based on the results, H1 was accepted. Despite having mixed views, most of the prior studies concluded that the role of authority had an important effect on innovative

orientation as well as on the intended behaviour of students to use e-learning (Igbaria et al., 1994; Lu et al., 2005; Sim et al., 2012). Two different predictors had tested the impact of innovative orientation, and the following results were obtained: Innovative orientation had a significant positive impact on user-friendly learning (β=0.282, t=4.207, p<0.01); hence, H2 was accepted. Similar findings were also derived in some prior studies. For example, the same statistical significance was found by Matute-Vallejo & Melero-Polo (2019) and Van Raaij & Schepers (2008) in the context of the impact of innovative orientation on user-friendly learning. Also, innovative orientation had a positive impact on expected performance (β=0.326, t=4.538, p<0.01); therefore, H3 was also accepted. The same results were generated in studies by Lu et al. (2005), Karimi (2016), and Kim & Park (2017), pointing to individual innovativeness as a key indicator of performance expectation.

On the other hand, user-friendly learning had a positive, statistically significant impact on the quality of e-learning (H4, β=0.226, t=4.770, p<0.01). Based on that, hypothesis H4 was accepted. The most important relationship in the model was confirmed with the calculated beta coefficient and statistical significance (H5, β=0.810, t=9.115, p<0.01). According to Wang et al. (2009) and Tan et al. (2014), e-learning can contribute to the quality of interaction between students and lecturers, to sharing materials, learning improvement, assignments, information security, and information access. The model did not test a direct link between IO and QE because it could not be claimed that the students' tendency to use innovations would increase the quality of e-learning. For instance, if the students are keen on experimenting with new technologies it does not necessarily mean that communication and feedback between lecturers and students will be useful. It does not mean that the used platform will be simple to use, download, and navigate. However, it is very interesting that innovative orientation had indirect positive impacts on the quality of e-learning through two predictors, such as UFL and EP in this model. Concerning the issue of quality of e-learning and behavioural intention to use e-learning, this study indicated a significant relationship between these two aspects (β=0.755, t=13.906, p<0.01), where H6 was confirmed. In line with earlier studies (Abu-Al-Aish and Love, 2013; Althunibat, 2015; Milosevic et al., 2015; Sabah, 2016), similar results indicated an important relationship between the two constructs. This result pointed out that, during the state of emergency, the achieved quality of e-learning had a beneficial implication on the students' and university's initiative to use e-learning even after the COVID-19 period.

Switching from a traditional learning model to an e-learning model, even after the emergency period should enable e-learning to provide a high quality, user-friendly, innovative approach, with improved performances and teaching skills. Furthermore, this model should provide comprehensive peer social cooperation and interaction, and enhance the relationship between innovative knowledge and previous experience, practical application, and scientific evaluation in virtual education. The elements mentioned above are a precondition and should provide a platform for an efficient and effective distance learning system that will produce constructive student behaviours.

Conclusion

In this paper, a survey was conducted to investigate students' behaviour and their perceptions of the role of authority, innovative orientation, expected performance, user-friendly learning, and quality of e-learning in the COVID-19 period. All proposed hypotheses confirmed the conceptual model. In this way, factors that significantly affect improvements were identified. The results of our research showed the readiness of students to use e-learning, given that during the pandemic, they used several different platforms and had positive attitudes to the items of behavioural intention in the use of e-learning. Finally, a comprehensive analysis that encompassed the e-learning experiences students gained during a state of emergency showed that e-learning was of high quality, user-friendly, innovative, with improved performance and initiatives of the authorities, thus fulfilling the third goal mentioned in the paper.

The main research contribution of the paper is in the researchers' timely response to the newly emerged situation the University faced during the COVID-19 period. The majority of researchers used causal-statistical modelling to recognise and understand the relationship between similar factors of e-learning. However, the theoretical contribution of the research is reflected in the expansion of previous research regarding the perception of these factors during COVID-19 in a developing country. This contribution has filled the research gap in the literature.

At the practical level, the research enables educators, decision-makers in academic institutions, and IT companies to better understand such situations and provide tips how to learn in unusual circumstances such as a pandemic. Additionally, the results help service providers and designers focus on e-learning factors in their advertising campaigns. Considering that most students learn "on-the-fly", this system of effortless learning will develop a positive feeling in students regarding the usefulness of e-learning, especially in situations like the COVID-19 disruption. From the managerial point of view, the findings provide the possibility for institutions such as the Ministry of Education, universities, and faculties to establish a strategic plan to improve technology-enhanced learning in different situations and areas after the pandemic.

The overall results show that the University of Belgrade performed relatively well in implementing e-learning triggered by the sudden pandemic. Adequate systems and multiple solutions were offered by the University institutions to continue teaching during this situation. Nevertheless, there is always enough room for improvement. The experience of the academic community acquired during the COVID-19 period, can bring about radical changes in the regular teaching process after the state of emergency ends in Serbia. In addition to all the negative consequences, the emergence of the coronavirus has pointed to something important. Namely, the teaching activities can be innovated in line with modern technologically-supported trends that can potentially enhance the regular education process in the future. Higher education institutions will increasingly turn to new teaching methods, and the traditional practice of physical presence will become the exclusivity of the most prestigious universities.

This paper's main limitation are the measuring instruments which may not have covered all investigated questions that reflected the actual state. The next limitation is the impossibility to observe the experience of lecturers involved in e-learning during the COVID-19 period. It is essential to consider all stakeholders, lecturers and students' perceptions, regarding the satisfaction with using e-learning to improve the effectiveness of the e-learning platform. The authors did not consider the achieved quality at the end of the semester during the implementation of the e-learning process, more precisely, a month after switching to e-learning. Besides, cognitive emotions in e-learning processes are not analysed in this study. All the identified limitations are also suggestions for future research.

Further research may also exploit some of the prediction methods, such as artificial neural networks, that would allow looking at future situations in applying new network technologies in the education system. The comprehensive experience acquired through the application of digital technologies at the University is beneficial given that a "surprising experience" such as COVID-19 can happen again in the future. These predictions are made by health authorities that anticipate a new pandemic in autumn when the following semester begins at universities worldwide. Finally, evaluation of the e-learning process compared to the traditional one, including exam results, the timing of exams, and the number of students who pass the exam would be an unavoidable topic for future research.

When the e-learning practice is in question, this paper indicates only some of the fundamental issues in a state of emergency. There are also many others, but the main idea is not in finding a quick solution for all the possible problems, but in initiating a permanent critical discussion and continuous reflection of key social structures about improving education, especially in the unforeseen circumstances such as a pandemic.

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Isidora Milošević
University of Belgrade, Technical Faculty in Bor
Vojske Jugoslavije 12, 19210 Bor, Serbia
imilosevic@tfbor.bg.ac.rs

Jelena Ruso
University of Belgrade, Faculty of Organizational Sciences
Jove Ilića 154, 11000 Belgrade, Serbia
jelena.ruso@fon.bg.ac.rs

Ana Rakić
University of Belgrade, Faculty of Organizational Sciences
Jove Ilića 154, 11000 Belgrade, Serbia
ana.rakic@fon.bg.ac.rs

Sanela Arsić
University of Belgrade, Technical Faculty in Bor
Vojske Jugoslavije 12, 19210 Bor, Serbia
saarsic@tfbor.bg.ac.rs

Đorđe Nikolić
University of Belgrade, Technical Faculty in Bor
Vojske Jugoslavije 12, 19210 Bor, Serbia
djnikolic@tfbor.bg.ac.rs

Appendix

APPENDIX A: Questionnaire Items Used in the Study (Milosevic et al., 2015)

Expected Performance (EP)

PE1. I think e-learning is useful for my studies during COVID-19.
PE2. Using e-learning would enable me to achieve learning objectives more quickly.
PE3. Using e-learning in my studying would increase my learning productivity during COVID-19.
PE4. E-learning could improve my collaboration with peers during COVID-19.
PE5. Using e-learning will improve my effectiveness during COVID-19.

User-friendly learning (UFL)

UFL1. The e-learning system is flexible and easy to use.
UFL2. The e-learning system does not require much effort.
UFL3. Using e-learning is clear and understandable.
UFL4. I can easily become skilled in using e-learning

The Role of Authority (RA)

RA1. I would use e-learning if it was recommended to me by faculty.
RA2. The professors provide adequate assistance in e-learning during COVID-19.
RA3. Instructors at my faculty initiate the use of e-learning

Quality of E-learning (QE)

QE1. E-learning increases the quality of learning during COVID-19.
QE2. The information I receive through e-learning is accurate and reliable.
QE3. E-learning enables information security.
QE4. In e-learning, the speed of Internet searches and timely reception of information is important.
QE5. Communication and feedback between the instructor and student are effective.
QE6. E-learning applications are easy to navigate and download.

Innovative Orientation (IO)

IO1. I like to experiment with new information technologies.
IO2. When I hear about new information technology, I look forward to examining it.
IO3. I think I was one of the first to accept innovations in learning during the state of emergency.

Behavioural Intention to Use E-learning (BIUE)

BIUE1. I plan to use e-learning tools in my studies after COVID-19.
BIUE2. If the faculty provides it, I will use e-learning frequently after COVID-19.
BIUE3. I intend to increase the employment of e-learning in the future.
BIUE4. I enjoy using e-learning services.
BIUE5. I would recommend to others the use e-learning services.

Biheviоralna namjera učenika u e-učenju tijekom pandemije Covid-19

Sažetak

Zbog pojave virusa COVID-19, novonastala situacija izazvala je brojne reakcije u obrazovanju, kako u svijetu tako i u Srbiji. Potaknuti ovim problemom, autori ovog rada proveli su istraživanje kako bi utvrdili namjere ponašanja učenika, kao i njihovu spremnost na korištenje e-učenja tijekom COVID-19. E-učenje je integriralo tehnologiju i obrazovanje te se pokazalo kao moćan alat koji obrazovnom sustavu omogućuje da odgovori na izazove modernog društva. U ovom istraživanju studentima Sveučilišta u Beogradu podijeljen je online upitnik. Za obradu rezultata korištena je SEM metodologija koja je omogućila provjeru postavljenih hipoteza. Dobiveni rezultati pokazali su da se Bihevioralna namjera korištenja e-učenja može izravno i neizravno predvidjeti zajedničkim utjecajem uloge autoriteta, inovativne orijentacije, učenja prilagođeno korisniku, očekivanog učinka i kvalitete elektroničkog učenja. Ovo saznanje omogućilo je provođenje sveobuhvatne analize koja je obuhvatila iskustva učenika u e-učenju tijekom izvanrednog stanja.

Ključne riječi: Bihevioralna namjera učenika; COVID-19; e-učenje; Modeliranje; Više obrazovanje.

Uvod

Od 2019. pandemija koronavirusa prisutna je u značajnom broju zemalja (Lipsitch i sur., 2020). Ruku pod ruku s gospodarskom krizom i slijedom problema izazvanih ovom pojavom, ni obrazovanje nije ostalo imuno na ovaj globalni problem koji je doveo do potpunog zatvaranja fakulteta i sveučilišta. Prema UNESCO-vom Monitoringu (www.en.unesco.org), 189 zemalja provelo je izolaciju diljem zemlje, a pet ih je uvelo lokalnu izolaciju, što utječe na oko 98.4 % studentske populacije diljem svijeta. Ova situacija natjerala je obrazovne sustave diljem svijeta da prilagode svoje nastavne sustave elektroničkim sustavima učenja na daljinu. To znači da je moralo doći do „ozbiljnog smanjenja broja i vrste sesija učenja licem u lice" (Evans i sur., 2020, str. 4) i da je morao biti izrađen vodič za studente dizajniran za online tečajeve. Ovaj novi okidač za prijelaz na digitalno obrazovanje nudi obrazovnim institucijama priliku da promisle o svom budućem pristupu ovom procesu.

Stalni razvoj informacijskih tehnologija (IT) uvijek nameće društvu nove izazove da se prilagođava, uči i usavršava (Mitić i sur., 2017). U svijetu obrazovanja korištenje informacijsko-komunikacijskih tehnologija (IKT) omogućilo je stvaranje novih pedagoških praksi i omogućilo stvaranje nekoliko modaliteta učenja na daljinu, uključujući mješovito učenje, čime je olakšano osnivanje virtualnih sveučilišta. Međutim, obrazovni sustav suočava se s izazovima kako ispuniti očekivanja tzv. „digitalnih" učenika jer oni imaju različite načine razmišljanja, interakcije i komunikacije, kao i očekivanja od obrazovnog sustava.

Prije pojave nove pandemije, platforme za online učenje bile su široko prihvaćene od strane obrazovnih institucija (Uppal i Gulliver, 2018), a razni uređaji i softver postali su popularne „igračke" za učenje među učenicima (Nikou i Economides, 2017). VLE, Moodle i Zoom smatraju se najpopularnijim digitalnim platformama u učenju (Horvat i sur., 2015; Chua i Chua, 2017; Dharma i sur., 2017; Sharma i sur. 2017; Ravat i Dvivedi, 2019). No, unatoč tehnološkim inovacijama i ulaganjima u obrazovanje, e-učenje kao novi pristup ne dobiva popularnost u zemljama u razvoju (Farid i sur., 2015). Na primjer, u proračunskim izdvajanjima kenijska sveučilišta ne daju prioritet e-učenju (Vershitskaia i sur., 2020). Zbog loše obrazovne infrastrukture, nedostatka stručnih profesora, sofisticiranog znanja, pristupa tehnologiji, osobnih problema, inhibitora odnosa i kontekstualnih inhibitora (Kureshi i sur., 2012; Teo i Milutinović, 2015; Zamani i Esfijani, 2016), metode upravljanja informacijskom tehnologijom nisu uvijek prikladne za zemlje trećeg svijeta (Mitić i sur., 2017). No, ova pandemija ne postavlja pitanje je li netko spreman, voljan ili sposoban brzo se prilagoditi brzim promjenama, uključujući i prisilno korištenje IT tehnologije. To više nije stvar izbora. Nužno je.

Srbija je zemlja u razvoju koja se nalazi na raskrižju srednje i jugoistočne Europe, a sustav učenja na daljinu (DLS) značajno je evoluirao u posljednjih nekoliko godina. Broj visokih učilišta koja uvode programe učenja na daljinu u proces akreditacije postupno raste. Međutim, prema podacima Nacionalnog tijela za akreditaciju i kontrolu kvalitete u visokom obrazovanju Srbije (NEAQA) (www.nat.rs), DLS nije široko zastupljen u srpskom visokom obrazovanju. Na temelju izvješća NEAQA-e, samo 67 studijskih programa trenutno je akreditirano za učenje na daljinu.

Povod za ovo istraživanje je novonastala situacija koja je onemogućavala nastavu na sveučilištima, koja se redovito odvijala prije COVID-19. Naime, sveučilišta su morala odmah reagirati na nagle promjene izazvane pandemijom virusa COVID-19. Također su imali problema s nastavkom redovne nastave na istoj razini kvalitete. Glavno pitanje bilo je kako poboljšati komunikaciju između profesora i studenata. Iako je nekoliko studija ispitivalo sustav e-učenja tijekom pandemije (Almaiah i sur., 2020.), još uvijek postoji vakuum u literaturi o utjecaju čimbenika na bihejvioralne namjere učenika da koriste e-učenje tijekom COVID-19 (Shahzad i sur., 2020). Stoga ova studija nastoji premostiti ovaj jaz u znanju istražujući te odnose u takvim okolnostima u zemlji u

razvoju. Cilj ovog istraživanja je ispitati prediktore bihevioralnih namjera učenika za korištenje e-učenja u izvanrednim situacijama.

Pregled literature

U svijetu koji pokreće tehnologija, sve veća uporaba komunikacijske tehnologije u obrazovanju pojavila se kao ključni aspekt razdoblja COVID-19 (Vrbik i sur., 2021). Fascinantna analogija koju treba spomenuti je odnos između drevnog Areopaga, E-učenja i „učionice" u smislu ravnopravne uključenosti svakog sudionika (profesora i studenata) u svaku temu na posebnom „elektroničkom Areopagu".

Razvoj informacijskih tehnologija ubrzano je napredovao u obrazovanju, pa su tradicionalne metode obrazovanja ubrzo zamijenjene tehnološkim metodama obrazovanja pomoću tehnoloških uređaja. Ovaj tehnološki napredak u obrazovanju poznat je kao e-učenje (Keegan, 2001). No, razvoj mobilnih tehnologija i važnost korištenja tehnologije u obrazovanju otkrili su novi pojam, m-učenje. „E-učenje je učenje podržano digitalnim elektroničkim alatima i medijima, a m-učenje je e-učenje korištenjem mobilnih uređaja i bežičnog prijenosa" (Kumar Basak i sur., 2018). Međutim, literatura je pokazala da je koncept e-učenja doista izazvao veliki interes među istraživačima (Tablica 1). Evolucija e-učenja stvorila je potrebu za inovativnim aplikacijama i platformama za podršku procesu podučavanja i učenja.

Tablica 1

Pregledom literature uočena je važnost dimenzije bihevioralna namjera učenika. Prema Chu i Chenu (2016., str. 38), bihevioralna namjera definirana je kao spremnost pojedinca da dovrši određeno ponašanje ili „stanje spremnosti učenika" u procesu e-učenja (Hanif i sur., 2018.). Također se odnosi na prihvaćanje i usvajanje novih tehnologija za njihovu uporabu u budućem procesu učenja (Sanchez-Prieto i sur., 2017). Teoretičari i znanstvenici smatraju da je bihevioralna namjera ključni faktor u korištenju informacijskih sustava, što se najbolje može objasniti kroz prizmu teorije planiranog ponašanja (TPB/TRA) i modela prihvaćanja tehnologije (TAM) (Shiau i Chau, 2016).

S obzirom na e-učenje, značajan odnos između bihevioralne namjere učenika i percipirane lakoće korištenja, kao i bihevioralne namjere učenika i percipirane korisnosti uočili su Chang i sur. (2017), Nikou i Economides (2017) i Ameen i sur. (2019). Revithi i Tselios (2019) ispitali su namjeru učenika da koriste sustave za upravljanje učenjem. Otkrili su da na to utječu percipirana korisnost, pristup sustavu, društvene norme, stav prema e-razredi i samoefikasnost. Neki autori pokazuju da je stjecanje znanja (znanje stečeno e-učenjem) istaknuti prediktor bihevioralne namjere korištenja digitalne tehnologije (Garcia-Sanchez, 2017; Al-Emran i Teo, 2019). Nadalje, Briz-Ponce i sur. (2017) anketirali su studente medicine kako bi otkrili njihovu percepciju mobilnog učenja i čimbenike koji utječu na ponašanje studenata. Zaključili su da društveni utjecaj i pouzdanost preporuke značajno utječu na stav i

bihevioralnu namjeru korištenja M-učenja. Osim toga, Abu-Al-Aish i Love (2013), Sabah (2016) i Milošević i sur. (2015) utvrdili su da kvaliteta e-učenja pozitivno utječe na bihevioralne namjere učenika. Stoga se, kako dosadašnja istraživanja pokazuju, pokazalo da ne postoje standardizirani pokazatelji koji mogu utjecati na ponašanje pojedinaca u kontekstu učenja na daljinu.

Kako bismo bolje razumjeli čimbenike o kojima ćemo raspravljati u sljedećem odjeljku, dane su definicije za svaki od njih:

Uloga autoriteta - Osnovna uloga nastavnika u aktivnoj podršci, ohrabrivanju, utjecaju i intervenciji pomaže učenicima da lakše i glatko prihvate e-učenje (Gil-Madrona i sur., 2020; Herodotou i sur., 2019).

Učenje prilagođeno korisniku – stupanj do kojeg studenti vjeruju da bi određeno iskustvo e-učenja bilo bez napora (Al-Emran i Teo, 2019; Estriegana i sur., 2019).

– Inovativna orijentacija – „namjera učenika da istražuje nove ideje i rješenja" (Lav i Geng, 2019, str. 901) ili pozitivni stavovi prema korištenju nove tehnologije (Aiub i sur., 2017).

– Očekivani učinak- Stupanj u kojem pojedinci vjeruju da će im sustavi e-učenja pomoći u postizanju cilja (Thongsri i sur., 2019).

– Kvaliteta e-učenja - Koprodukcijski proces između učenika i okruženja za učenje kako bi se učenik motivirao, potakao i osnažio (Al-Fraihat i sur., 2019).

Uloga autoriteta (RA)

Na planirano ponašanje učenika u korištenju e-učenja značajno utječe uloga autoriteta. Nadalje, treba imati na umu da primjena IT-a u obrazovanju zahtijeva stalno preispitivanje uloge koju imaju profesori i sveučilišta kao i jednostavnost i primjerenost platforme za učenje na daljinu (Rodrigues i sur., 2019). Štoviše, ova inovacija utječe na akademski učinak studenata i sposobnost studenata i profesora da se nose s novim izazovima (Rodrigues i sur., 2019). Različite studije u literaturi sugeriraju da su studenti često vrlo dobro utemeljeni u IT-u, zbog čega je uloga autoriteta ključna za prihvaćanje inovacija e-učenja (Lu i sur., 2005; Sim i sur., 2012).

Osim toga, na učinkovitost e-učenja mogu utjecati individualne karakteristike učenika kao što su motivacija za učenje, stil učenja ili predznanje (Venkatesh i sur., 2003). Preporuke i stavovi predavača mogu značajno utjecati na usvajanje M-učenja od strane studenata (Venkatesh i sur., 2003). Imajući to na umu, online obrazovanje treba biti usklađeno sa zahtjevima i karakteristikama učenika radi njihove bolje motivacije i angažmana u e-učenju (Ren i sur., 2017). Kako bi motivirali studente za korištenje novih tehnologija, većina autora zaključuje da profesori prvo moraju pristati i prilagoditi se uvođenju novih IT-a u obrazovanje (Milošević i sur., 2015). Prema prethodnoj analizi, predložena je sljedeća hipoteza:

H1. Uloga autoriteta (RA) pozitivno utječe na inovativnu orijentaciju učenika (IO).

Inovativna orijentacija (IO)

U procesu obrazovanja inovativno orijentirane osobe pokazuju sklonost korištenju novih tehnologija (Ozcan i sur., 2016). Inovativna orijentacija je sklonost ili spremnost osobe da eksperimentira ili isproba nove IT tehnologije (Van Raaij i Schepers, 2008). Schillevaert i sur. (2005) nalaze da prilagodba novim sustavima može brže otkriti jednostavnost korištenja za inovativne pojedince nego za neinovativne pojedince. Inovativna osoba voli ići ukorak s najnovijim tehnologijama u svojim domenama (Robinson i sur., 2005) i igra ključnu ulogu u prihvaćanju „E" ili „M" učenja (Joo i sur., 2014; Sharma i sur., 2017).

Van Raaij i Schepers (2008) pronašli su izravan pozitivan učinak osobne inovativnosti na percipiranu lakoću korištenja sustava. U istraživanju Nikou i Economidesa (2017) ova statistička značajnost nije potvrđena. Inovativna orijentacija kao karakteristika učenika vrlo je značajna u doprinosu bihevioralnim namjerama za e-učenje. Drugim riječima, što su učenici otvoreniji za isprobavanje novih tehnologija, veća je vjerojatnost da će otkriti korisnost e-učenja (Al-Busaidi, 2013). Nedavno su Ayub i sur. (2017) ispitali čimbenike koji utječu na percepciju učenika o korištenju mobilnih aplikacija u učenju. Izvijestili su da jedan čimbenik, poput osobne inovativnosti, utječe na stavove učenika prema korištenju mobilnih aplikacija. Isti zaključak usvojili su Matute-Vallejo i Melero-Polo (2019), koji su pokazali da će, u obrazovnom kontekstu, inovativnost uskoro biti jedan od prediktora jednostavnosti korištenja u online poslovnoj simulaciji. Stoga je postavljena sljedeća hipoteza:

H2. Inovativna orijentacija učenika (IO) pozitivno utječe na učenje prilagođeno korisniku (UFL).

Nadalje, dok je istraživao motivatore M-učenja, Karimi (2016) je otkrio da, u određenim okruženjima, usmjerenost na inovacije utječe na očekivani učinak. Slično, Lui i sur. (2005) i Kim i Park (2017) naveli su individualnu inovativnost kao ključni čimbenik koji određuje očekivani učinak. Nadalje, Ngafeeson i Sun (2015) istaknuli su pozitivan utjecaj između inovativnosti i bihevioralnog ponašanja istražujući prihvaćanje e-udžbenika od strane učenika, dok su Sharma i sur. (2017) otkrili su da inovativnost ljudi utječe na kontinuiranu uporabu sustava za upravljanje e-učenjem kao što je Moodle. Kako bi proučili čimbenike koji utječu na usvajanje e-učenja od strane studenata, Salloum i sur. (2018) utvrdili su beznačajan utjecaj inovativnosti na prihvaćanje e-učenja kod studenata. Postojeća literatura potvrdila je utjecaj osobne inovativnosti na percipirana očekivanja (Thakur i Srivastava, 2014). Konačno, prema Miloševic i sur. (2015), utvrđeno je da osobna inovativnost ima izravan utjecaj na planirano ponašanje učenika u M-učenju. Sve navedeno dokazuje da je inovativna studentska orijentacija često istraživana i raspravljana dimenzija obrazovne literature. Stoga je postavljena sljedeća hipoteza:

H3. Inovativna orijentacija učenika (IO) pozitivno utječe na njihov očekivani učinak (OU).

Učenje prilagođeno korisniku (UFL)

Sustav učenja prilagođen korisniku pozitivno utječe na želju učenika za odabirom ili korištenjem ponuđenih rješenja (Salloum i sur., 2018). Učenje prilagođeno korisniku predstavlja „razinu za koju korisnik vjeruje da bi korištenje određenog sustava bilo bez napora" ili učenje bez poteškoća ili velikog radnog opterećenja (Estriegana i sur., 2019). Različite studije pokazale su da će korisnici biti spremniji učiti o njegovim značajkama i spremniji ga koristiti ako je sustav jednostavan za korištenje (Chiu i Wang, 2008., Hamid i sur., 2016.). Na temelju toga zaključuje se da je učenje prilagođeno korisniku pozitivno povezano sa željom za nastavkom korištenja sustava u online okruženju (Chiu i Wang, 2008; Hamid i sur., 2016). Stoga je razumno pretpostaviti da što je platforma za e-učenje ugodnija za korištenje, to su mišljenja učenika o e-učenju pozitivnija (Estriegana i sur., 2019). Sukladno tome, razvija se sljedeća hipoteza:

H4. Učenje prilagođeno korisniku (UFL) ima pozitivan učinak na kvalitetu e-učenja (QE).

Očekivani učinak (EP)

U literaturi se očekivani učinak prepoznaje kao svijest pojedinca da će korištenje određenog sustava ili platforme pomoći u postizanju željenog cilja (Venkatesh i sur., 2003). Okolina može pozitivno ili negativno utjecati na sposobnost pojedinca da se uključi u e-učenje (Tsai i sur., 2015). E-učenje je korisno za studente jer poboljšava učinak, kvalitetu učenja, kao i njihovu produktivnost učenja (Wang i sur., 2009). E-učenje daje studentima mogućnost da brzo završe svoje zadatke u ugodnom okruženju (Sabah, 2016). Štoviše, dok se korisnost IT-a temelji na učinku jedne osobe, učinkovitost sustava za e-učenje duboko se oslanja na suradnju između profesora i studenata (Islam, 2017). Studenti smatraju da je e-učenje korisno u suradnji s nastavnicima i kolegama (Sabah, 2016). Dakle, ono što značajno utječe na članove akademske zajednice da usvoje e-učenje je očekivani učinak (Gunasinghe i sur., 2019). Sukladno tome, pretpostavlja se sljedeća hipoteza:

H5. Očekivani učinak (EP) pozitivno utječe na kvalitetu e-učenja (QE).

Kvaliteta e-učenja (QE)

Percipirana kvaliteta razlikuje se od osobe do osobe zbog subjektivnog kriterija koji se obično definira kao „prikladnost za uporabu" (Juran, 1981; Uppal i Gulliver, 2018). E-učenje treba studentima pružiti priliku za komunikaciju i korištenje dostupnih tehnologija, a profesorima za izradu i isporuku nastavnih materijala, postavljanje zadataka ili komunikaciju sa studentima – korisnicima (Vasconcelos i sur., 2019). Stoga je određivanje kvalitete e-učenja ključno za proizvodnju visoke kvalitete ove usluge, koja osigurava kontinuirano korištenje usluge, i obrnuto (Sharma i sur. 2017). Al-Fraihat i sur. (2019) definiraju kvalitetu e-učenja kao „proces koprodukcije između učenika i okruženja za učenje kako bi se omogućio i osnažio učenik". Također je

utvrđeno da povećanje kvalitete usluga može osigurati zadovoljstvo učenika e-učenjem (Al-Fraihat i sur., 2019). U okruženju e-učenja, Liav i sur. (2007) uspoređuju odnos između kvalitete e-učenja i samoučinkovitosti, percipirane korisnosti i percipiranog užitka. Šesta hipoteza je sljedeća:

H6. Kvaliteta e-učenja (QE) pozitivno utječe na bihevioralnu namjeru korištenja e-učenja (BIUE).

Ova studija postavlja hipotezu o faktorima koji utječu na bihevioralnu namjeru studenata da koriste e-učenje u visokom obrazovanju u razdoblju COVID-19. Prikaz 1 ilustrira predloženi model istraživanja, gdje je BIUE (ovisna varijabla) predložen s jednim neovisnim i četiri zavisna prediktora.

Prikaz 1

Metodologija

Prikupljanje podataka i veličina uzorka

U novonastaloj situaciji u razdoblju COVID-19, cijeli obrazovni sustav Srbije bio je primoran prilagoditi svoj nastavni sustav elektroničkim sustavima učenja na daljinu. Autori ovog rada istraživali su ovu temu kako bi ispitali je li nastavni proces u Srbiji fleksibilan i sposoban za inovacije u skladu sa suvremenim tehnološkim trendovima. Sveučilište u Beogradu je najstarije i najveće državno sveučilište u Srbiji, koje se sastoji od 31 akreditiranog fakulteta (Savić i sur., 2014; Lovren i sur., 2020). Osim toga, Sveučilište u Beogradu je međunarodno priznato kao jedno od 500 najbolje rangiranih sveučilišta u svijetu na listi Šangajskog sveučilišta „Cao Tun" (www.shanghairanking.com).

Istraživanje je provedeno na Sveučilištu u Beogradu na samom početku vanrednog stanja izazvanog korona virusom u Srbiji (tijekom ožujka i travnja 2020). Prikupljeni kvantitativni podaci izračunati su u statističkom softveru SPSS kako bi se odgovorilo na istraživačka pitanja i njihove hipoteze. Ciljani ispitanici bili su studenti Sveučilišta u Beogradu.

Za prikupljanje uzorka distribuiran je online upitnik nasumičnim uzorkovanjem. Zbog jednostavnosti distribucije i popunjavanja odabrana je metoda online anketiranja, kako bi se obuhvatila različita pitanja o temi koja se istražuje, kao i mogućnost pružanja informacija i interaktivnosti na visokoj razini (Ilieva i sur., 2002; Cobanoglu i Çobanoglu, 2003). Dalje, online upitnik se smatra važnom kvantitativnom istraživačkom metodom zbog velike brzine prikupljanja podataka i niskih troškova implementacije (Vu i Hoffman, 2011; Nugroho i sur., 2019). Upitnik je sproveden u samo četiri tjedna, a dobijena su 1254 točno popunjena odgovora. Na temelju istraživanja Ahmad i Love (2013) i Milošević i sur. (2015) izrađen je modificirani upitnik koji je služio za testiranje postavljenih hipoteza. Upitnik se sastojao od dva dijela. U prvom dijelu prikazani su demografski podaci ispitanika (spol, dob i godina studija, znanje o e-učenju prije izvanrednog stanja i korištene platforme za e-učenje

tijekom izvanrednog stanja). Drugi dio ankete mjerio je namjere ponašanja ispitanika da koriste e-učenje (Dodatak A). Anketa se sastojala od 6 dimenzija sa 26 pitanja, a svako pitanje je mjereno na Likertovoj skali od 5 stupnjeva u rasponu od 1 do 5 (uopće se ne slažem do u potpunosti se slažem).

Namjera studenata da koriste e-učenje u izvanrednim situacijama na Sveučilištu u Beogradu procijenjena je metodom potvrdne faktorske analize (CFA). Modeliranje strukturnih jednadžbi korišteno je za ispitivanje predloženih odnosa, koji su uključivali dvije komponente: (1) mjerni model i (2) strukturni model (Anderson i Gerbings, 1988). CFA je provedena za procjenu diskriminativne i konvergentne valjanosti, dok je analiza puta korištena za procjenu koeficijenata puta za konstrukte. Prikupljeni podaci statistički su obrađeni programima SPSS v.20 i Amos v.20.0 metodom maksimalne vjerojatnosti. Ovom metodom procijenjena je dobrota pristajanja modela i testirani učinci opterećenja i korelacije između predloženih konstrukcija.

Analiza podataka i rezultati

Demografska analiza

Demografski podaci o ispitanicima prikazani su u Tablici 2. Vidljivo je da je najviše ispitanika bilo u dobi od 22 do 25 godina (51.4 %), koji su pohađali četvrtu godinu studija (47.8 %). Što se tiče znanja o e-učenju koje su studenti posjedovali prije izvanrednog stanja, naveli su da je većina njih imala odgovarajuće predznanje o tome (45.7 %). Što se tiče korištenja platformi za e-učenje prije razdoblja COVID-19, odgovori su podjednako podijeljeni, 52.6 % učenika koristilo je platforme prije izvanrednog stanja, a 47,4 % nije koristilo platforme za e-učenje. Što se tiče učestalosti korištenja e-usluga tijekom izvanredne situacije, 80.6 % studenata navelo je da su usluge e-učenja koristili 1-5 puta dnevno. Rezultati su pokazali da su se dvije ili više platformi često koristile (54.5 %) tijekom COVID-19.

Tablica 2

Evaluacija mjernog modela

U ovom članku provedena je potvrdna faktorska analiza kako bi se procijenila pouzdanost i valjanost mjerne ljestvice. Pouzdanost unutarnje konzistentnosti provedena je među pokazateljima svakog konstrukta. U ovom istraživanju korištena je metoda Cronbach Alpha za analizu je li određeni prediktor neovisan o drugim prediktorima (Cronbach, 1951). Vrijednost pouzdanosti svake konstrukcije modela prikazana je u Tablici 3. Rezultati su pokazali visok stupanj koeficijenta pouzdanosti, pri čemu se vrijednost od 0.70 ili više smatra prihvatljivom (Sabah, 2016). Cronbachova alfa za model bila je vrlo visoka na 0.928. Vrijednost koeficijenata za većinu konstrukata prelazi 0.7 i pokazuje visoku pouzdanost, osim za jedan, čija vrijednost iznosi 0.684, no prema (Hair i sur., 1995) to bi se smatralo prihvatljivim.

Tablica 3

Procjena konvergentne i diskriminativne valjanosti provedena je kako bi se ispitala valjanost mjernog instrumenta. Konvergentna valjanost temelji se na korelaciji između stavki u istom faktoru. U skladu s tim, za procjenu konvergentne valjanosti modela korištena su standardizirana faktorska opterećenja promatranih varijabli, kompozitna pouzdanost i prosječne ekstrahirane vrijednosti varijance za svaki konstrukt (Fornell i Larcker, 1981; Sabah, 2016; Zhu i Lin, 2019). Tablica 3 pokazuje da su standardizirana opterećenja stavki postigla konvergentnu valjanost u mjernom instrumentu, prema kriterijima Fornell & Larcker (1981). Standardizirana faktorska opterećenja su značajna ako je vrijednost iznad 0.5, CR je bio iznad 0.7, a AVE za svaki faktor bio je iznad 0.5, što se smatralo prihvatljivim (Hair i sur., 2017). Može se zaključiti da je većina konstrukata u ovoj fazi zadovoljila zahtjeve pouzdanosti i konvergentne valjanosti. Iznimno, AVE vrijednosti Uloge autoriteta (AVE=0.425) i Kvalitete e-učenja (AVE=0.402) bile su nešto niže od 0.50. Međutim, prema Fornell i Larcker (1981), AVE se može prihvatiti s vrijednošću višom od 0.4 ako je kompozitna pouzdanost veća od 0.6. U ovom istraživanju vrijednosti pouzdanosti svih kompozita bile su veće od 0.6, pri čemu je konvergentna valjanost konstrukata još uvijek bila primjerena.

Tablica 4 prikazuje vrijednosti fit indeksa i predložene vrijednosti korištene za određivanje mjernog modela. Tipično, fit indeks je značajan kada je vrijednost $\chi 2/df$ jednaka ili manja od 3 (Carmines Edward i McIver John, 1981). Preporučene vrijednosti CFI, NFI, RFI i IFI jednake su ili veće od 0.90 (Carroll i sur., 2002). Prema Browne i Cudeck (1993), vrijednost TLI jednaka je ili veća od 0.95, a RMSEA je manja ili jednaka 0.05. Predloženi model zadovoljio je preporučene vrijednosti fit indeksa i pokazao da je model zadovoljavajući.

Tablica 4

Prema preporuci Fornella i Larkera (1981.), kvadratni korijen AVE mora biti veći od njihove unakrsne korelacije između svih konstrukata. Tablica 5 prikazuje da je kvadratni korijen AVE većine konstrukata u paru bio veći od korelacije među konstruktima, što je potvrdilo njihovu diskriminirajuću valjanost, osim u konstruktu Kvaliteta e-učenja. Glavni razlog za to bio je taj što je potvrdna analiza rezultirala nižim AVE vrijednostima od praga od 0.5 (Tablica 5), što je utjecalo na diskriminirajuću valjanost konstrukcije kvalitete e-učenja.

Tablica 5

Procjena strukturnog modela i testiranje hipoteza

SEM je korišten za testiranje i potvrdu predloženih hipoteza i definiranje razine uzročne povezanosti između varijabli (Hair i sur., 2010.). Strukturni model je dobro odgovarao podacima ($\chi 2/df=1.71$, CFI=0.97, RMSEA=0.041, NFI=0.93, RFI=0.91, IFI=0.97 i TLI=0.96). U Tablici 6 prikazani su dobiveni rezultati SEM-a, kojim su testirane predložene hipoteze. Izračunate procjene u strukturnom modelu pokazale su da su sve uspostavljene veze očekivano potvrđene. Također, neizravni odnosi među latentnim grupama pokazali su značajne posredničke učinke između konstrukata.

Prikaz 2 prikazuje standardizirane regresijske koeficijente analize putanje za strukturni model i odgovarajuće objašnjene varijance za ovisne konstrukcije. „Međutim, rasprava o rezultatima strukturnog modela je nepotpuna bez razmatranja neizravnih učinaka i koeficijenata determinacije (R2) za svaku strukturnu jednadžbu u kvantitativnom modelu" (Schreiber i sur., 2006., str. 335). Stoga je za ovaj model 33.1 % varijacija u BIUE bilo neobjašnjivo. Alternativno, 66.9 % varijance pripisuje se utjecajima izravnih i neizravnih prediktora BIUE, što je bilo vrlo prihvatljivo za određivanje linearnog odnosa između konstrukata. Nadalje, rezultati su pokazali da RA objašnjava 16.9 % varijance IO, IO 17.6 % varijance UFL, IO 22.2 % varijance EP, dok IO, UFL i EP objašnjavaju 92.6 % varijance QE. Koeficijent determinacije otkriva utjecaj latentnih konstrukata korištenja e-učenja među studentima koji se može izračunati s 43.2 % varijance. Može se zaključiti da dobiveni rezultati opisuju količinu varijance koju svaki latentni konstrukt objašnjava na svakom endogenom konstruktu. Stoga su vrijednosti R2 bile veće od 0.16 za sve konstrukte koji su pokazali da je strukturni model imao prediktivnu relevantnost (Q2>0) (Estriegana, 2019).

Tablica 6

Prikaz 2

Rasprava

Novonastala situacija u periodu COVID-19 onemogućila je izvođenje redovnog nastavnog procesa na sveučilištima u Srbiji. Kako bi se prevladao jaz između nastavnog procesa tijekom pandemije COVID-19 i zahtjeva studenata, sveučilišta su morala odmah odgovoriti na nagle promjene i nastaviti pružati kvalitetne nastavne procese na platformama za e-učenje. Stoga ova studija istražuje prediktore bihevioralne namjere studenata da koriste e-učenje u hitnim slučajevima i spremnost studenata da koriste e-učenje koristeći različite platforme za učenje na daljinu.

SEM je korišten za objašnjenje namjere ponašanja studenata da koriste e-učenje u hitnim slučajevima. Prateći kriterije drugih istraživača o bihevioralnim namjerama studenata za korištenjem e-učenja, prethodno je predloženo pet konstrukata za bolje razumijevanje faktora koji utječu na usvajanje inovativnih, suvremenih i tehnoloških trendova u obrazovanju. Dobiveni rezultati su pokazali da je model u potpunosti zadovoljavajući. Pouzdanost interne konzistencije svakog konstrukta i vrijednosti kompozitne pouzdanosti, diskriminantne i konvergentne valjanosti bile su prihvatljive s visokom razinom statističke značajnosti.

Pri mjerenju pouzdanosti mjerne ljestvice vidljivo je da je najveću vrijednost imao prediktor Bihevioralna namjera korištenja e-učenja. Ovo ukazuje da su determinante dobro odabrane za konstrukt koji mjeri namjere ponašanja studenata da koriste e-učenje i da su bile dosljedne u svim prilikama. Također, pouzdanost determinanti mogla se promatrati u svim ostalim mjernim konstruktima u modelu. Konvergentna valjanost postignuta je jer su vrijednosti faktorskog opterećenja bile veće od 0.5, a

kompozitna pouzdanost i AVE vrijednosti bile su iznad preporučenih. Također, vrijednosti AVE bile su veće od kvadrata korelacije između faktora koji su dokazali diskriminativnu valjanost.

Sumiranjem rezultata vezanih za šest hipoteza dobiveni su sljedeći rezultati. Nalazi ove studije potvrdili su da je pozitivan učinak Uloge autoriteta na Inovativnu orijentaciju unutar intervala pouzdanosti od 99 % (β= 0.411, t=5.658, p<0.01). Na temelju rezultata prihvaćena je hipoteza H1. Unatoč pomiješanim stajalištima, većina prethodnih studija zaključila je da je Uloga autoriteta imala važan utjecaj na Inovativnu orijentaciju kao i na Biheviоralne namjere studenata u korištenju e-učenja (Igbaria et al., 1994; Lu et al. , 2005; Sim i sur., 2012). Dva različita prediktora testirala su utjecaj inovativne orijentacije i dobiveni su sljedeći rezultati. Inovativna orijentacija imala je značajan pozitivan utjecaj na učenje prilagođeno korisniku (β=0.282, t=4.207, p<0.01); stoga se hipoteza H2 prihvaća. Do sličnih su otkrića došla i neka ranija istraživanja. Na primjer, istu statističku značajnost pronašli su Matute-Vallejo i Melero-Polo (2019) i Van Raaij i Schepers (2008) u smislu utjecaja inovativne orijentacije na učenje prilagođeno korisniku. Također, Inovativna orijentacija imala je pozitivan utjecaj na Očekivani učinak (β=0.326, t=4.538, p<0.01); stoga se prihvaća i hipoteza H3. Isti su rezultati dobiveni u studijama Lu i sur. (2005), Karimi (2016) i Kim i Park (2017), ukazujući na individualnu inovativnost kao ključni pokazatelj Očekivanog učinka.

S druge strane, Učenje prilagođeno korisniku imalo je pozitivan, statistički značajan utjecaj na Kvalitetu e-učenja (H4, β=0.226, t=4.770, p<0.01). Na temelju toga prihvaćena je hipoteza H4. Potvrđena je najvažnija poveznica u modelu s dobivenim beta koeficijentom i statističkom značajnošću (H5, β=0.810, t=9.115, p<0.01). Prema Wang i sur. (2009) i Tan i sur. (2014), e-učenje može pridonijeti kvaliteti interakcije između studenta i profesora, razmjeni materijala, poboljšanju učenja, zadataka, informacijskoj sigurnosti i pristupu informacijama. Model nije testirao izravni odnos između IO i KE jer se ne može tvrditi da bi sklonost studenata korištenju inovacija povećala kvalitetu e-učenja. Primjerice, ako studenti žele eksperimentirati s novim tehnologijama, to ne znači da će komunikacija i povratna informacija između profesora i studenata biti korisna. To ne znači da će korištena platforma biti jednostavna za korištenje, preuzimanje i navigaciju. No, vrlo je zanimljivo da je u ovom modelu Inovativna orijentacija neizravno pozitivno utjecala na Kvalitetu e-učenja kroz dva prediktora, kao što su UFL i EP. Što se tiče pitanja Kvalitete e-učenja i Namjere korištenja e-učenja, ova studija je ukazala na značajnu vezu između ova dva aspekta (β=0.755, t=13.906, p<0.01), čime je hipoteza H6 potvrđena. U skladu s prethodnim studijama (Abu-Al-Aish i Love, 2013; Althunibat, 2015; Milošević i sur., 2015; Sabah, 2016), slični rezultati ukazuju na važnu vezu između ova dva konstrukta. Ovaj rezultat pokazao je da je Kvaliteta e-učenja postignuta tijekom izvanrednog stanja imala korisne implikacije na inicijativu studenata i sveučilišta za korištenje e-učenja nakon razdoblja COVID-19.

Prijelaz s tradicionalnog modela učenja na model e-učenja, čak i nakon izvanrednog razdoblja, trebao bi omogućiti da e-učenje pruži visokokvalitetan, korisniku pristupačan,

inovativan pristup, s poboljšanom izvedbom i vještinama poučavanja. Štoviše, ovaj model trebao bi omogućiti sveobuhvatnu međuvršnjačku društvenu suradnju i interakciju, ojačanu vezu između inovativnog znanja i prethodnog iskustva, praktičnu primjenu i znanstvenu evaluaciju u virtualnom obrazovanju. Gore navedeni elementi su preduvjet i trebali bi pružiti platformu za učinkovit i učinkovit sustav učenja na daljinu koji će proizvesti konstruktivno ponašanje učenika.

Zaključak

U ovom radu provedeno je istraživanje kako bi se ispitalo ponašanje učenika i njihova percepcija uloge autoriteta, inovativne orijentacije, očekivanog učinka, učenje prilagođeno korisniku i kvalitete e-učenja u razdoblju COVID-19. Sve predložene hipoteze potvrdile su konceptualni model. Na taj način identificirani su faktori koji značajno utječu na poboljšanja. Rezultati provedenog istraživanja pokazali su spremnost studenata za korištenje e-učenja, s obzirom da su tijekom pandemije koristili više različitih platformi i imali pozitivne stavove o bihevioralnoj namjeri korištenja e-učenja. Konačno, sveobuhvatna analiza koja je uključila iskustva studenata u e-učenju stečena tijekom izvanrednog stanja pokazala je da je e-učenje bilo visoke kvalitete, jednostavno za korisnike, inovativno, s poboljšanim učinkom i inicijativama nadležnih tijela, čime je ispunjen treći cilj naveden u radu.

Glavni istraživački doprinos rada je suvremeni odgovor istraživača na novonastalu situaciju s kojom se Sveučilište suočilo tijekom razdoblja COVID-19. Većina istraživača koristila je kauzalno-statističko modeliranje da bi prepoznala i razumjela vezu između sličnih faktora e-učenja. Međutim, teorijski doprinos ovog istraživanja ogleda se u proširenju prethodnih istraživanja u vezi sa percepcijom ovih faktora tijekom COVID-19 u zemlji u razvoju. Ovaj teorijski doprinos popunio je prazninu u literaturi.

Praktično, ovo istraživanje omogućuje edukatorima, donositeljima odluka u akademskim institucijama i IT institucijama da bolje razumiju takve situacije i daju savjete za učenje u ovim neuobičajenim okolnostima kao što je pandemija. Osim toga, rezultati pomažu pružateljima usluga i dizajnerima da se usredotoče na faktore e-učenja u svojim reklamnim kampanjama. Budući da većina učenika uči „u hodu", ovaj sustav učenja bez napora će razviti pozitivan osjećaj o korisnosti e-učenja, posebno u situacijama kao što je pandemija COVID-19. S menadžerskog gledišta, nalazi omogućuju tijelima poput Ministarstva obrazovanja, sveučilišta i koledža da uspostave strateški plan za poboljšanje učenja uz pomoć tehnologija u različitim situacijama i područjima nakon pandemije.

Ukupni rezultati pokazuju da je Sveučilište u Beogradu bilo relativno dobro u implementaciji e-učenja uzrokovanog iznenadnom pandemijom. Sveučilišne ustanove ponudile su odgovarajuće sustave i višestruka rješenja za nastavak nastave u ovoj situaciji. Međutim, uvijek ima dovoljno prostora za napredak. Iskustvo akademske zajednice stečeno u periodu COVID-19 može pokrenuti radikalne promjene u redovnom nastavnom procesu nakon prestanka vanrednog stanja u Srbiji. Uz sve

negativne posljedice, pojava korona virusa ukazala je i na nešto važno. Naime, nastavne aktivnosti mogu se inovirati u skladu sa suvremenim tehnološki podržanim trendovima koji potencijalno mogu unaprijediti budući redovni obrazovni proces. Visoka će se učilišta sve više okretati novim metodama podučavanja, a tradicionalna praksa fizičkog pohađanja nastave postat će ekskluzivitet najprestižnijih sveučilišta.

Glavno ograničenje ovog rada su mjerni instrumenti koji možda nisu pokrili sva istražena pitanja koja odražavaju stvarno stanje. Sljedeće ograničenje je nedostatak promatranja iskustva profesora uključenih u E-učenje u razdoblju COVID 19. Potrebno je uzeti u obzir sve dionike, profesore i percepciju studenata o zadovoljstvu korištenja e-učenja za poboljšanje performanse platforme za e-učenje. Autori nisu uzeli u obzir kvalitetu postignutu na kraju semestra tijekom provedbe procesa e-učenja, točnije mjesec dana nakon prelaska na e-učenje. Osim toga, kognitivne emocije u procesima e-učenja nisu analizirane u ovoj studiji. Sva prepoznata ograničenja također su prijedlozi za buduća istraživanja.

U daljnjim istraživanjima mogu se koristiti i neke od metoda predviđanja, poput umjetnih neuronskih mreža, koje bi omogućile sagledavanje budućih situacija u primjeni novih mrežnih tehnologija u obrazovnom sustavu. Sveobuhvatno iskustvo stečeno primjenom digitalnih tehnologija na Sveučilištu korisno je s obzirom da bi se „iznenađujuće iskustvo" poput COVID-a 19 moglo ponoviti u budućnosti. Ove prognoze daju predstavnici zdravstvenih institucija koji predviđaju novu pandemiju na jesen kada će početi sljedeći semestar na sveučilištima diljem svijeta. Konačno, vrednovanje procesa e-učenja u usporedbi s tradicionalnim, uključujući rezultate ispita, vrijeme ispita i broj studenata koji su položili ispit bila bi nezaobilazna tema za buduća istraživanja.

Kada je riječ o praksi e-učenja, ovaj rad ukazuje samo na neke od temeljnih problema u izvanrednom stanju. Ima ih još mnogo, ali glavna ideja nije brzo rješavanje svih mogućih problema, već pokretanje stalne kritičke rasprave i kontinuiranog promišljanja ključnih društvenih struktura o unapređenju obrazovanja, posebice u nepredviđenim okolnostima poput pandemije.

DODATAK A: Stavke upitnika korištene u studiji (Milošević i sur., 2015.)

Očekivani učinak (EP)

PE1. Mislim da je e-učenje korisno za moje studiranje tijekom COVID-19.
PE2. Korištenje e-učenja omogućilo bi mi brže postizanje zadataka učenja.
PE3. Korištenje e-učenja u mom učenju povećalo bi moju produktivnost učenja tijekom COVID-19.
PE4. E-učenje bi moglo poboljšati moju suradnju s kolegama tijekom bolesti COVID-19.
PE5. Korištenje e-učenja poboljšat će moju učinkovitost tijekom COVID-19.

Učenje prilagođeno korisniku (UFL)

UFL1. Sustav za e-učenje je fleksibilan i jednostavan za korištenje.
UFL2. Sustav e-učenja ne zahtijeva puno truda.
UFL3. Korištenje e-učenja je jasno i razumljivo.
UFL4. Lako mogu postati vješt u korištenju e-učenja.

Uloga autoriteta (RA)

RA1. Koristio bih E-learning da mi je to preporučio fakultet.
RA2. Profesori pružaju adekvatnu pomoć u e-učenju tijekom COVID-19.
RA3. Predavači na mom fakultetu iniciraju korištenje e-učenja.

Kvaliteta e-učenja (QE)

QE1. E-učenje povećava kvalitetu učenja tijekom COVID-19.
QE2. Informacije koje dobivam putem E-learninga točne su i pouzdane.
QE3. E-učenje omogućuje informacijsku sigurnost.
QE4. Za e-učenje je važna brzina pretraživanja interneta i pravodobno primanje informacija.
QE5. Komunikacija i povratna informacija između profesora i studenta su učinkoviti.
QE6. Aplikacije za e-učenje jednostavne su za navigaciju i preuzimanje.

Inovativna orijentacija (IO)

IO1. Volim eksperimentirati s novim informacijskim tehnologijama.
IO2. Kad čujem za novu informacijsku tehnologiju, veselim se ispitivanju.
IO3. Mislim da sam bio jedan od prvih koji je prihvatio novine u učenju za vrijeme izvanrednog stanja.

Bihevioralna namjera korištenja e-učenja (BIUE)

BIUE1. Planiram koristiti alate za e-učenje u svom studiju nakon COVID-19.
BIUE2. Ako fakultet omogući, često ću koristiti e-učenje nakon COVID-19.
BIUE3. U budućnosti namjeravam povećati korištenje e-učenja.
BIUE4. Uživam koristiti usluge e-učenja.
BIUE5. Drugima bih preporučio korištenje usluga e-učenja.