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# Exploring e-learning critical success factors in digitally underdeveloped countries during the first wave of the COVID-19

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## ABSTRACT

Regarding the fact that the entire spring semester in higher education was based on online teaching realized at the state University of East Sarajevo, and that the students thus gained a completely new experience, the aim of this research is to identify and study the e-learning critical success factors (CSF) on the basis of the students' perceptions. A number of 356 students of all 17 faculties with in the University participated in the research. The students' attitudes were collected by the instrument containing 36 items, constructed on the basis of a comprehensive review of previous researches of the e-learning critical success factors and semi-structured interview with the students. Seven factors were extracted and studied by the factor analysis: quality learning materials, student's attitude toward e-learning, teacher's attitude toward e-learning, technological support, classroom interaction, student's activities and teacher's attitude towards students. In response to the pandemic, universities are expected to change their traditional concept of learning and offer models of distance learning in the future. Therefore, the results of this research may be of key importance for the selection and implementation of the appropriate e-learning applications and platforms.

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## Introduction

The COVID-19 pandemic has forced schools and universities to quickly transfer from face-to-face to online learning. Almost all countries classified as developed economies report a high number of infected cases; thus, most countries closed their universities and campuses and shifted to online lessons (Crawford et al., 2020). Universities focus on finding alternative ways for achieving their goals and turning this serious emergency situation into an important opportunity for expanding innovations at the educational and professional level and for improving experiences. Establishing rules and creating strategies stand out as the key aspects of responding to the crisis. Apart from the extensive offer, the quality and equality in education are the second most critical issues that require attention. Although online lessons are no longer a novelty, the universities' managements are aware that not all members of academic community are equally skilled at using the connected technology and managing virtual classrooms. A completely online course requires a complex design of the curriculum and teaching materials, such as audio and video contents, but also the development of technology support teams. However, due to the sudden occurrence of COVID-19, most academic communities are facing the issue of the lack of online teaching experience, as well as the support of the educational technology teams. Michael Murphy (2020) writes that this is not the first time that e-learning is a response to emergency situations and crises and that such measures

were also applied in the autumn of 2009, due to the emergence of H1N1, as well as in 2005 when Hurricane Katrina physically damaged 27 colleges in the Gulf region and Texas.

In order to provide support to their students, lecturers, researchers, and other staff, as well as to retain the quality that they have had up to this point, special web pages are created at the networks of world-leading universities which daily publish all information and instructions related to the COVID-19 disease, but also regarding the plans and strategies for learning and research in accordance with the current situation. Throughout the United States, the academic management hurriedly organized the workshops in order to introduce the faculty with modern remote digital tools for teaching and learning, which have made a significant progress in their sophistication and efficiency (Fernandez & Shaw, 2020). The management of all public and private higher education institutions in Bosnia and Herzegovina reacted quickly and made decisions in order to continue the teaching process. At the moment of the declaration of the decision to shift from face-to-face learning to e-learning, most universities in Bosnia and Herzegovina did not have unique platforms for learning, nor were the teaching staff and students trained to use a large number of freely available platforms. Additionally, a support team for using the information technologies in the teaching process was not formed. Considering the fact that the crisis occurred suddenly and unexpectedly and that the third world countries are unstable in all their segments even during normal conditions, the higher education institutions in Bosnia and Herzegovina managed to respond to the challenge, realizing the entire semester through online learning.

### **Conceptual framework of study**

The aim of this research is to find critical success factors (CSF) in online lessons in order to improve the teaching practice and adapt the elements of teaching process to distance learning. The term CSF appeared in the literature in the late 1970s with the purpose of establishing the factors that influence the success of business organizations (Ingram et al., 2000) and, at the end of this century, it was expanded to the field of online learning and teaching. The identification and measurement of CSFs of online learning help educational institutions develop the systems of e-learning that are suitable for both students' and lecturers' expectations (Selim, 2007). CSFs should be few, measurable, and controlled (Masrom et al., 2008). The estimation of the experiences of the participants in e-learning can be used as the measurement for the improvement of the e-learning system (Cheriyani, 2018). Volery and Lord (2000) emphasize that if universities wish to have the maximum use of Internet, they need to identify and understand the critical success factors that influence the online education (Volery & Lord, 2000).

Scientific literature contains several critical factors that are identified in almost all researches, but there is still no agreement on the number of factors critical for the success in e-learning. A number of studies mostly distinguish critical factors that coincide with teaching factors (student, teacher, teaching content, teaching technology). Thus, Volery and Lord (2000) single out three factors: Technology, Instructor, Previous use of technology. Soong and associates (2001) report five factors: Human factors, Technical competencies of both instructor and student, E-learning mindsets of both instructor and student, Level of collaboration, and Perceived information technology infrastructure. Baylor and Ritchie (2002) identified three factors: Educational technology, Instructor characteristics, and Student characteristics. Selim (2007) points out at seven different factors, three of which are derived from the students' characteristics, and the remaining four include Technology, the Instructor's characteristics, Support, and E-learning usage. Cheriyani (2018) distinguishes five factors: technological support, e-learning resources, e-learning support and training, characteristics of students, and characteristics of the instructor. The reason for distinguishing and identifying a different number of factors is perceived by the researchers in the differences in the nature of studies and their goals, programs, surroundings, etc.

## Methodology

### Research question

The aim of this research is to identify and study the e-learning critical success factors on the basis of the students' perceptions during crisis.

### Research sample

The research sample was comprised of 356 students from all 17 faculties of the University of East Sarajevo (Table 1).

### Instrument

Even though there is a number of high-quality questionnaires for the assessment of success factors of online studying, their direct application in their original form was not possible in the circumstances that the universities from Bosnia and Herzegovina are in. The first reason is that the available questionnaires were exclusively intended and used at higher education institutions that offered study programs through online learning. The second reason is that students voluntarily chose online studying in accordance with their needs and affinities. The third reason is that higher education institutions that realize online lessons have all the necessary conditions and resources for that aspect of studying. The stated reasons have generated a need for the creation of a new instrument that would establish the success factors of online learning, with the aim to improve online lessons in the future, which is, at this point rather uncertain. By reviewing the relevant literature on e-learning and instruments (Baylor & Ritchie, 2002; Cheriyan, 2018; Kearney et al., 2020; Miranda et al., 2017; Selim, 2007; Soong et al., 2001; Volery & Lord, 2000) for establishing the critical success factors (CSF) and on the basis of the responses from the semi-structured interviews with 27 students of the University of Eastern Sarajevo, an instrument with 80 items was created. By the final review within the research group, certain items were eliminated or recomposed because they were repeated or were not intelligible enough. In the second step, after the selection of two content experts and two instrument development experts, the expert council was formed to make quantitative and qualitative estimations on each item within the instrument. In the end, a questionnaire was created consisting of two parts. The first part of the questionnaire encompasses socio-demographic data on the interviewees: the year of studies, the name of the faculty, the average mark, and data on their place of residence. The second part of the questionnaire comprises 36 statements that involve 4 most frequent groups of factors that influence the success in e-learning, which are at the same time teaching factors (factors related to the teacher, factors related to the student, factors related to the teaching content and technological environment). The students' task was to mark the degree of agreement with the given statements from 1 to 5, where 1 is the lowest and 5 is the highest value. The development of the instrument ELCSCF and the metric characteristics of the used questionnaire are presented in detail in the "Results" section.

**Table 1.** Socio-demographic structure of the sample.

Year of studies				
1	2	3	4	5
37	136	92	87	4
Place of residence				
City	Municipality	Village		
154	111	91		
Average mark				
6–7.5	7.5–8.5	8.5–10		
85	186	85		

## **Procedure**

Considering the state of emergency caused by the Coronavirus at all universities in Bosnia and Herzegovina, lessons in the summer semester of the academic year 2019/2020 were realized through online learning. The process of collecting data from students was initiated in the second half of May, that is, two weeks before the end of the semester, and it had two stages. In the first stage, through a semi-structured interview, qualitative data was collected from 27 students of the Faculty of Education, the University of East Sarajevo. The semi-structured interview was sent to students by e-mail, and their task was to express their opinion and attitudes on their experiences during online learning through four points: factors related to the teacher, factors related to the student, factors related to the teaching content and technological environment. The students' responses were classified and used for creating the questionnaire for the assessment of the success factors in e-learning. The second stage in data collection was realized during the last week of the semester. Students of all faculties of the University of East Sarajevo were sent the instrument in electronic format by representatives of students' organizations. By the end of the semester, 356 responses were gathered.

## **Data analysis**

Data analysis was conducted using IBM SPSS Statistics Version 26. Cronbach's alpha coefficient was calculated for determining internal consistency. The principal component analysis method was used to determine the validity, and then Varimax rotation with Kaiser normalization was applied. The number of factors was determined on the basis of the results of Cattell scree test using Guttman–Kaiser criteria and calculating the intra-correlation values.

## **Results**

The reliability of the questionnaire was established using Cronbach's alpha coefficient that had the value of .923 for the entire scale, which presents a high internal consistency. The item analysis was presented in [Table 2](#).

The values of the alpha reliability coefficient for individual items range from .919 and .925 which indicates the high internal consistency.

## **Validity analysis**

To examine the adequacy of the data, the Kaiser–Meyer–Olkin measure was applied to all variables together. Kaiser–Meyer–Olkin measure ranges in the interval from 0 to 1, where the values lower than .5 indicate the inadequacy of the correlation matrix for factor analysis, that is, the value of .6 is recommended as the lowest value acceptable for a good factor analysis. The Bartlett's test is used to test the null hypothesis that there is no significant correlation between the original variables ([Table 3](#)).

Since Kaiser–Meyer–Olkin measure's value is 0.918, it can be stated that the data of the used variables are adequate for conducting factor analysis ([Figure 1](#)).

On the basis of the scree plot criterion founded on the Cattell's diagram, there is a noticeable break between factors seven and eight, which confirms the distinguishing of seven factors, because their eigenvalues are separate from the eigenvalues of the remaining factors. Cattell (1966) recommends retaining all factors above the elbow, that is, the curve of the graph, because they contribute most to explaining variance in a data set. Specifically, there is a visible bend at the junction of the seventh and eighth factors, implying at the conclusion that the first seven factors explain a much higher percentage of variance than the remaining factors.

**Table 2.** Internal consistency.

Item	Mean	Std. deviation	Corrected item-total correlation	Cronbach's alpha if item del.
1. If we are open to introductions of innovations based on e-learning, we will more easily achieve the goals of lessons.	3.60	1.226	.461	.922
2. We will achieve better results if we are motivated for learning through online platforms.	3.49	1.379	.449	.923
3. Our previous experience in using computer and software applications for e-learning enables us to more easily manage distance learning.	3.93	1.208	.304	.925
4. Better results are achieved if we solve tasks regularly and continuously.	4.38	0.961	.498	.921
5. Cooperation between students in the process of e-learning has a significant impact on understanding the materials and solving tasks.	4.11	1.182	.492	.921
6. In order to achieve the set goals, we have to successfully use IT technologies.	4.11	0.958	.499	.921
7. For achieving success, it is significant to be actively involved in the process of e-learning.	4.26	1.002	.480	.921
8. We will successfully pass the exams if we study on regular basis.	4.52	0.877	.415	.922
9. E-learning requires from us to organize our learning time well.	3.99	1.210	.495	.921
10. It is important that teachers have a true interest in students' progress.	4.76	0.627	.588	.920
11. It is important that the teacher is motivated to help students in the process of e-learning.	4.75	0.655	.671	.919
12. It is important that the teacher uses the tools for e-learning well.	4.65	0.669	.635	.920
13. It is important that the teacher encourages interaction during e-learning through tasks and discussions.	4.53	0.820	.569	.920
14. It is important that the teacher encourages a student to cooperate with other students.	4.33	0.968	.515	.921
15. It is important that the teacher encourages students to participate in lessons.	4.51	0.930	.513	.921
16. It is important that the teacher evaluates the students' commitment.	4.84	0.541	.567	.921
17. It is important that the teacher treats the students with respect.	4.86	0.510	.547	.921
18. It is important that the teacher is always available for consultations.	4.69	0.695	.366	.922
19. It is important that the teacher regularly and promptly answers the students' questions.	4.66	0.720	.507	.921
20. It is important that there is a clear and detailed introduction of students with the goals of lessons.	4.72	0.650	.565	.920
21. It is important that the scope of the learning materials sent to students is optimal and measured.	4.80	0.562	.610	.920
22. It is important that there are clear and precise instructions and examples for processing topics and tasks.	4.81	0.539	.698	.920
23. It is important that the materials are regularly, at the previously determined time, sent to students.	4.77	0.598	.580	.920
24. It is important that the learning content is clear and comprehensible.	4.84	0.501	.671	.920
25. It is important that there is a precise reference to additional literature.	4.67	0.686	.500	.921
26. It is important that lectures and exercises are well-harmonized.	4.80	0.537	.607	.920
27. It is important that there is a clear connection between the theory and practice.	4.81	0.499	.586	.921
28. It is important to provide clear and detailed instructions on the manner of evaluation.	4.79	0.552	.660	.920
29. It is important to send a feedback within the optimal period.	4.77	0.598	.582	.920
30. It is important to have a simple access to the internet.	4.78	0.591	.510	.921
31. It is important to have optimal internet speed.	4.66	0.688	.405	.922

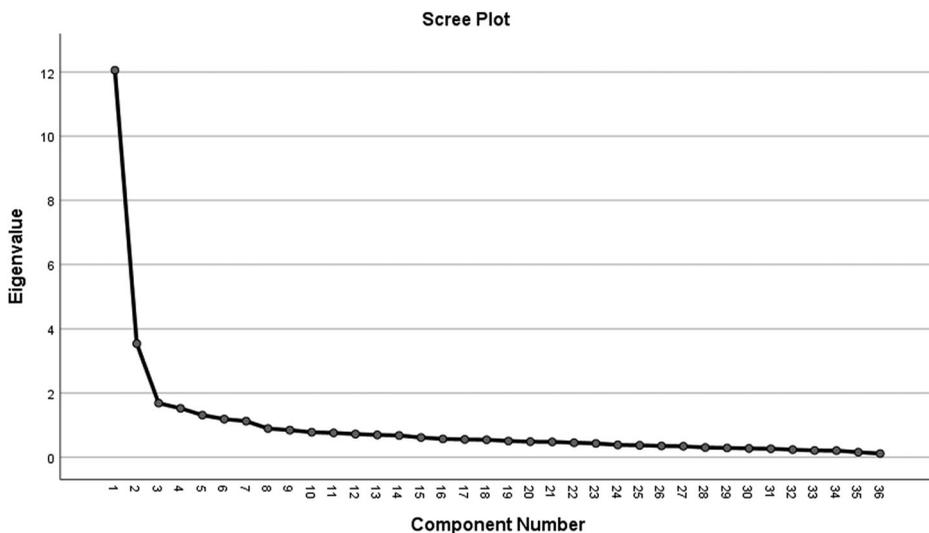
*(Continued)*

**Table 2.** Continued.

Item	Mean	Std. deviation	Corrected item-total correlation	Cronbach's alpha if item del.
32. It is important to have free internet.	4.23	1.066	.237	.925
33. It is important to have adequate computer equipment.	4.53	0.763	.440	.921
34. It is important to have a possibility to return to the unfinished tasks.	4.70	0.615	.511	.921
35. It is important to have the possibility to measure the learning progress.	4.49	0.824	.495	.921
36. It is important to have the possibility to communicate through different online platforms.	4.55	0.816	.540	.920

**Table 3.** KMO and Bartlett's test.

Kaiser–Meyer–Olkin measure of sampling adequacy		0.918
Bartlett's test of sphericity	Approx. Chi-Square	6931.909
	Df	630
	Sig.	0.000

**Figure 1** . Scree plot.

The factor analysis of the principal components was applied in the research. The basis for its implementation was an unreduced correlation matrix. By applying the factor analysis of the principal components, after the transformation of the variables into orthogonal axes has been carried out, the factors are extracted on the basis of their eigenvalues. [Table 4](#) shows the matrix of factor structure for 36 variables after the analysis of the principal components.

After factor extraction, orthogonal rotation of factors was performed in this study (whereby factor axes were retained at right angles) applying the method Varimax rotation with Kaiser normalization, the aim of which is for each variable to be representative with as few factors as possible and the best possible spatial dispersion. The structure of factor loadings after the rotation allows a better interpretation of the factors in relation to the initial factor matrix. The rotation has confirmed the structure of seven factors ([Table 5](#)).

According to [Hair et al. \(2010\)](#) criterion, for statistical significance of factor loadings with the probability of 95% based on the sample size, all factors with the loading above .3 in a case when the

**Table 4.** Principal component matrix.

Item	1	2	3	4	5	6	7	Com.
22. It is important that there are clear and precise instructions and examples for processing topics and tasks.	.791							.727
28. It is important to provide clear and detailed instructions on the manner of evaluation.	.767							.694
24. It is important that the learning content is clear and comprehensible.	.763			-.355				.762
26. It is important that lectures and exercises are well-harmonized.	.716							.660
11. It is important that the teacher is motivated to help students in the process of e-learning.	.707		-.338		-.332			.810
21. It is important that the scope of the learning materials sent to students is optimal and measured.	.695							.601
27. It is important that there is a clear connection between the theory and practice.	.692							.603
29. It is important to send a feedback within the optimal period.	.687							.628
12. It is important that the teacher uses the tools for e-learning well.	.686					-.308		.651
23. It is important that the materials are regularly, at the previously determined time, sent to students.	.668							.600
20. It is important that there is a clear and detailed introduction of students with the goals of lessons.	.646							.518
16. It is important that the teacher evaluates the students' commitment.	.636							.509
10. It is important that teachers have a true interest in students' progress.	.627		-.398		-.370			.800
17. It is important that the teacher treats the students with respect.	.619				.312			.582
30. It is important to have a simple access to the internet.	.616	-.333						.590
13. It is important that the teacher encourages interaction during e-learning through tasks and discussions.	.604		-.422					.612
34. It is important to have a possibility to return to the unfinished tasks.	.599							.510
19. It is important that the teacher regularly and promptly answers the students' questions.	.592						.420	.665
25. It is important that there is a precise reference to additional literature.	.590							.513
36. It is important to have the possibility to communicate through different online platforms.	.589						-.311	.511
35. It is important to have the possibility to measure the learning progress.	.551			.324		.328		.583
15. It is important that the teacher encourages students to participate in lessons.	.548		-.397	.306				.707
14. It is important that the teacher encourages a student to cooperate with other students.	.530		-.350	.320	.347			.710
33. It is important to have adequate computer equipment.	.507	-.301	.343	.384				.624
31. It is important to have optimal internet speed.	.487	-.329			-.320			.602
9. E-learning requires from us to organize our learning time well.	.451	.451						.576
3. Our previous experience in using computer and software applications for e-learning enables us to more easily manage distance learning.		.616						.503
2. We will achieve better results if we are motivated for learning through online platforms.	.372	.585	.331			-.318		.722
5. Cooperation between students in the process of e-learning has a significant impact on understanding the materials and solving tasks.	.438	.565						.521
1. If we are open to introductions of innovations based on e-learning, we will more easily achieve the goals of lessons.	.389	.531	.350			-.357		.730
6. In order to achieve the set goals, we have to successfully use IT technologies.	.439	.528						.565
4. Better results are achieved if we solve tasks regularly and continuously.	.472	.511						.594

*(Continued)*



sample is larger than 350 have a statistical significance and they need to be included into the interpretation.

Table 6 shows eigen values of factors before and after the Varimax rotation.

Seven extracted factors after the rotation have critical values higher than 1; therefore, those seven factors explain 62.342% of variance. It is noticeable that the percentage of total variance for the relevant factors is greater than .60, that is, 60%, which is the lowest permissible limit in social research. The higher the variance, the higher the simplicity of factors is.

## Discussion

About 36 items were subjected to factor analysis, and they represent the success factors of online learning according to the students' attitudes. The results of the conducted factor analysis have shown the seven-factor structure of the questionnaire, that is, the analysis of principal components and orthogonal Varimax rotation distinguish seven factors with characteristic eigenvalues above 1. The first factor called "quality learning materials" encompasses 11 variables (24, 26, 22, 29, 23, 28, 21, 27, 25, 20, and 16) and explains 18,196 of the total variance in the data. The second factor called "student's attitude toward e-learning" encompasses five variables (2, 1, 3, 6, and 5) and explains 9527 of the total variance in the data. The third factor called "teacher's attitude toward e-learning" encompasses four variables (10, 11, 12, and 13) and explains 8394 of the total variance in the data. The fourth factor called "technological support" encompasses six variables (33, 31, 32, 34, 30, and 35) and explains 8253 of the total variance in the data. The fifth factor called "classroom interaction" encompasses three variables (14, 15, and 36) and explains 7062 of the total variance in the data. The sixth factor called "student's activities" encompasses four variables (8, 7, 9, and 4) and explains 5689 of the total variance in the data. The seventh factor called "teacher's attitude towards students" encompasses three variables (18, 19, and 17) and explains 5222 of the total variance in the data.

This research identifies and distinguishes seven factors, two of which derive from students' characteristics, two from the teacher's characteristics, and the remaining three refer to the learning content, technology, and interaction in an online classroom. The obtained results coincide to a sufficient extent with the findings in previous studies. Most published studies distinguish the characteristics of students and teachers as the main factors in the teaching process (Baylor & Ritchie, 2002; Selim, 2007; Soong et al., 2001). The quality of technology as a success factor in online learning was identified in the studies of Volery and Lord (2000), Soong et al. (2001), Baylor and Ritchie (2002), and Selim (2007). The design and organization of the learning content, the factor that proved to be the most significant in our research, was particularly distinguished in the researches of Selim (2007) and Baylor and Ritchie (2002).

Even though the results coincide with previous researches this paper is based on, there are also differences that can be attributed to the specific circumstances the students were exposed to. This research distinguishes the interaction in an online classroom as a separate factor, which indicates that it was very significant to students, who were suddenly forced to shift from face-to-face to

**Table 6.** Total variance explained.

Component	Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1.	12,054	33,485	33,485	6550	18,196	18,196
2.	3543	9843	43,327	3430	9527	27,722
3.	1687	4686	48,013	3022	8394	36,116
4.	1526	4240	52,253	2971	8253	44,369
5.	1314	3650	55,903	2542	7062	51,431
6.	1190	3305	59,209	2048	5689	57,121
7.	1128	3134	62,342	1880	5222	62,342

online lessons, for retaining the communication with both teachers and other students from their study group. In a traditional system of learning, the manager plans the structure of education, a teacher models the lectures, and a student attends the lessons and uses the offered learning contents. Regardless of the statics of the aforementioned structure, the traditional work is still dominant at universities. Deterrents to the online learning environment posed a threat to the participants learning due to lack of internet connectivity, the interaction between faculty instructor and participant, and absence of human contact between the instructor and learner (Kamble et al., 2021, p. 209). There are attempts of introducing innovations in the teaching process that go in several directions, namely: didactic-methodical innovations (forms, methods, teaching aids) and system innovations (introducing new teaching systems – problem-based learning, project method, e-learning, etc.). Regardless of the quality of innovations, the basic structure of the system remains. The reasons of its survival should be sought in the social role of education as a phenomenon because education is also a socialization process. The direct communication that takes place in education, both vertically teacher–student and horizontally student–student, is still considered exceptionally significant because the emotional relation that stimulates the learning process is important in teaching. In an e-classroom, the manager creates the learning principle and monitors its development, a teacher enters the data on teaching subjects and creates tests, and a student reads the content the teacher has entered and does the tests. Essentially, the teacher creates the necessary content in accordance with the defined goals and outcomes of learning. The thing that stood out as a novelty in studying during the pandemic is certainly the possibility of organizing the time and place for learning. Managing time and work environment is a part of the behavior control, and it includes creating a learning schedule and allocating time for different activities in an appropriate learning place (Živčić-Bećirević et al., 2017). It is a known fact that, during the state of emergency, a curfew was introduced, which signified a complete ban on leaving the housing unit. Although it may seem that, under those circumstances, students had enough time to organize their learning pace in accordance with their individual possibilities, the emergence of pandemic deteriorated the state of their mental health, mostly due to the shut-down of universities, losing the routine, and limited social relations. Additionally, the researches that assess the implications of COVID-19 on mental health reveal the increased prevalence of depressive and anxiety symptomatology from moderate to severe conditions reflecting extensive effects of insecurity and fear (Wang et al., 2020).

The identification of critical success factors in online lessons has a double role – in theoretical terms, they deepen the theoretical assumptions about the success of distance learning, whereas in practical terms, they serve as guidelines both to managements of higher education institutions and to the instructors that intend to integrate the internet technologies in their work. It would be beneficial to assist teachers to adopt the mastery-approach to information technology and to better understand what information technology means to them (e.g. focusing on learning and applying new skills and knowledge in their classes rather than outperforming their colleagues), and it would be important to promote teachers' interest in learning and using information technology, to encourage them to take more initiatives in the process and to encourage them to seek help from their peers (Sun et al., 2020). Remote learning, a phrase regularly used in schools and universities in their 2020–2021 pandemic guidance, simply means learning, which happens when the learner and teacher are not in the same place, and possibly not active at the same time (Greener, 2021), but spread of COVID-19 has created an opportunity for many educational institutions to implement distance learning for the first time (El Refae et al., 2021, p. 105).

A very significant point is that the examination of CSF occurs in different situations; thus, scientific results can be applied depending on the surroundings in which that higher education institution operates. It is definitely not the same to explore CSF at the universities that have a long experience and all necessary infrastructure and resources for conducting online lessons and at the universities that were unprepared for the crisis caused by the COVID-19 pandemic. Instructional technology, as a research field with several sub-divisions, has played a major role in cushioning the effect of this

pandemic on educational activities by serving as the only platform for instructional design, delivery and assessment platforms (Adedoyin & Soykan, 2020). The research that was conducted at the sample of students who attended online lessons, not of their own volition, is particularly specific in respect to the fact that the students had an opportunity to compare the traditional lessons with the online lessons and to objectively assess and compare the factors that contribute to the success in the realization of the set goals, but also in respect to the fact that the learning process was conducted in the conditions of social isolation and high stress due to the care for preserving health, that is, in an uncertain situation that created instability in all segments of the society. It is well established that the Covid-19 pandemic has had a dramatic impact on education, and disproportionately so for students from areas of socio-economic disadvantage (Bray et al., 2021, p. 437). At the time of conducting the research and writing the report on the obtained results, no research papers were found on the platforms dealing with the critical success factors in online lessons during the pandemic.

## Conclusion

The state of emergency caused by the pandemic of COVID-19 that affected the entire world created a need for the transformation of traditional concepts of teaching. In the region of Bosnia and Herzegovina, the entire educational system was transferred to online lessons. Even though the system was not prepared for the challenge of transitioning to the new manner of studying, like in most underdeveloped countries, the universities succeeded in completing the semester and preparing students for exam terms. Considering the first experiences the students had acquired in the newly arising learning circumstances, their attitudes on the success factors in online lessons were gathered and analyzed. To that end, a instrument ELCSFC was created for the evaluation of success in online learning and its metric characteristics were confirmed. The reliability of the questionnaire was confirmed using Crombach's alpha coefficient that shows a high internal consistency of the instrument.

Factor analysis distinguished seven critical success factors in online learning. The extracted factors explain the dimensions of success in online learning in a sufficient measure. The percentage of the total variance is 62.342% which is acceptable for the fields of social research. Communalities of each variable in the presented analysis are relatively high which indicates that the variance of the original values is well covered by the factors.

The research of the critical success factors in online learning during the pandemic of COVID-19 will have a key role in the creation of an efficient community for internet learning and in adjusting the elements of the teaching process to studying in extraordinary circumstances. E-learning has certainly become an extremely successful and highly competitive sector in which educational content is delivered on the Internet, using technology, and the success of which is a result of the influence of different factors that combine the elements of traditional and e-learning (Miranda et al., 2017).

The extent of efficiency of the solutions the universities around the world offered is still unknown at this point, and it is assumed that it will take a longer period of time to assess their success. Research into the impact of the COVID-19 crisis on education is critical in enabling policymakers to make evidence-based decisions regarding education policies and practices in the context of the COVID-19 pandemic (Chadwick & McLoughlin, 2021, p. 203). What is certain is that the pandemic has had disproportionately greater consequences on unstable and underdeveloped countries in all fields of social policy and economy, including education, which will have a direct impact on the increase of inequality in education around the world. This is definitely not the first great crisis the higher education institutions in Bosnia and Herzegovina are facing, but what is completely new is the transition to online learning. The universities from Bosnia and Herzegovina readily responded to the crisis caused by the war during the period from 1992 to 1995, which, in comparison to the current crisis, was incomparably harder, more traumatic and complicated, but the consequences of this sudden educational crisis, which is occurring together with a much wider social, economic and political crisis, are still unknown, and it will remain the case until the end of the pandemic.

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## References

- Adeyoin, O. B., & Soykan, E. (2020). Covid-19 pandemic and online learning: The challenges and opportunities. *Interactive Learning Environments*, 1–13. <https://doi.org/10.1080/10494820.2020.1813180>
- Baylor, A. L., & Ritchie, D. (2002). What factors facilitate teacher skill, teacher morale and perceived student learning in technology-using classrooms? *Computers & Education*, 39(4), 395–414. <http://amybaylor.com/Articles/2002CAE.pdf> [https://doi.org/10.1016/S0360-1315\(02\)00075-1](https://doi.org/10.1016/S0360-1315(02)00075-1)
- Bray, A., Banks, J., Devitt, A., & Chorcora, E.N. (2021). Connection before content: Using multiple perspectives to examine student engagement during Covid-19 school closures in Ireland. *Irish Educational Studies*, 40(2), 431–441. <https://doi.org/10.1080/03323315.2021.1917444>
- Cattell, R. B. (1966). The scree test for the number of factors. *Multivariate Behavioral Research*, 1(2), 245–276. [https://doi.org/10.1207/s15327906mbr0102\\_10](https://doi.org/10.1207/s15327906mbr0102_10)
- Chadwick, R., & McLoughlin, E. (2021). Impact of the COVID-19 crisis on learning, teaching and facilitation of practical activities in science upon reopening of Irish schools. *Irish Educational Studies*, 40(2), 197–205. <https://doi.org/10.1080/03323315.2021.1915838>
- Cheriyann, N. (2018). *Critical success factors for e-learning: An Indian perspectives International Conference on Culture Technology (ICCT 2018)*. Zhijiang College of Zhejiang University of Technology. [https://www.researchgate.net/publication/330900864\\_Critical\\_Success\\_Factors\\_for\\_E-learning\\_An\\_Indian\\_Perspective](https://www.researchgate.net/publication/330900864_Critical_Success_Factors_for_E-learning_An_Indian_Perspective)
- Crawford, J., Kerry, B. H., & Jürgen, R. (2020). COVID-19: 20 countries’ higher education intra-period digital Pedagogy responses. *Journal of Applied Teaching and Learning*, 3(1), 9–28. <https://doi.org/10.37074/jalt.2020.3.1.7>
- El Refae, G. A., Kaba, A., & Eletter, S. (2021). The impact of demographic characteristics on academic performance: Face-to-face learning versus distance learning implemented to prevent the spread of COVID-19. *The International Review of Research in Open and Distributed Learning*, 22(1), 91–110. <https://doi.org/10.19173/irrodl.v22i1.5031>
- Fernandez, A. A., & Shaw, G. P. (2020). Academic leadership in a time of crisis: The coronavirus and COVID-19. *Journal of Leadership Studies*, 14(1), 39–45. <https://doi.org/10.1002/jls.21684>
- Greener, S. (2021). Exploring remote distance learning: What is it and should we keep it? *Interactive Learning Environments*, 29(1), 1–2. <https://doi.org/10.1080/10494820.2021.1848506>
- Hair, J., Black, W., Babin, B., & Anderson, R. (2010). *Multivariate data analysis – a global perspective*. Pearsib.
- Ingram, H., Biermann, K., Cannon, J., Neil, J., & Waddle, C. (2000). Internalizing action learning: a company perspective. Establishing critical success factors for action learning courses. *International Journal of Contemporary Hospitality Management*, 12(2), 107–114.
- Kamble, A., Gauba, R., Desai, S., & Golhar, D. (2021). Learners’ perception of the transition to instructor-led online learning environments: Facilitators and barriers during the COVID-19 pandemic. *The International Review of Research in Open and Distributed Learning*, 22(1), 199–215. <https://doi.org/10.19173/irrodl.v22i1.4971>
- Kearney, S., Gallagher, S., & Tangney, B. (2020). ETAS: An instrument for measuring attitudes towards learning English with technology. *Technology, Pedagogy and Education*, 29(4), 445–461. <https://doi.org/10.1080/1475939X.2020.1764381>
- Masrom, M., Zainon, O., & Rahiman, R. (2008). Critical success in e-learning: An examination of technological and institutional support factors. *International Journal of Cyber Society and Education*, 1(2), 131–142. [https://www.researchgate.net/publication/228410786\\_Critical\\_Success\\_in\\_Elearning\\_An\\_Examination\\_of\\_Technological\\_and\\_Institutional\\_Support\\_Factors](https://www.researchgate.net/publication/228410786_Critical_Success_in_Elearning_An_Examination_of_Technological_and_Institutional_Support_Factors)

- Miranda, P., Isaias, P., Costa, C. J., & Pifano, S. (2017). Validation of an e-learning 3.0 critical success factors framework: A qualitative research. *Journal of Information Technology Education: Research*, 16, 339–363. <https://doi.org/10.28945/3865>
- Murphy, M. (2020). COVID-19 and emergency eLearning: Consequences of the securitization of higher education for post-pandemic pedagogy. *Contemporary Security Policy*, 41(3), 492–505. <https://doi.org/10.1080/13523260.2020.1761749>
- Selim, H. (2007). Critical success factors for e-learning acceptance: Confirmatory factor models. *Computers & Education*, 49(2), 396–413. <https://doi.org/10.1016/j.compedu.2005.09.004>
- Soong, B. M. H., Chan, H. C., Chua, B. C., & Loh, K. F. (2001). Critical success factors for on-line course resources. *Computers & Education*, 36(2), 101–120. [https://doi.org/10.1016/S0360-1315\(00\)00044-0](https://doi.org/10.1016/S0360-1315(00)00044-0)
- Sun, M., Du, J., & Xu, J. (2020). The validation of the teachers' goal orientations for professional learning scale (TGOPLS) on information technology. *Technology, Pedagogy and Education*, 29(5), 527–539. <https://doi.org/10.1080/1475939X.2020.1808523>
- Volery, T., & Lord, D. (2000). Critical success factors in online education. *International Journal of Educational Management*, 14(5), 216–223. <https://doi.org/10.1108/09513540010344731>
- Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health*, 17(5), 1729–1754. <https://doi.org/10.3390/ijerph17051729>
- Živčić-Bećirević, I., Smojver-Ažić, S., & Martinac-Dorčić, T. (2017). Predictors of university students' academic achievement: A prospective study. *Drustvena Istrazivanja*, 26(4), 457–476. <https://doi.org/10.5559/di.26.4.01>