

Effects and the Analyzing of E-Learning on Higher Education During COVID-19 Period Time – Case Study University "Ukshin HOTI" Prizren

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Hamdi Hoti¹, Arbër H. Hoti²(✉), Edisona Kurhasku²

¹ University of Prizren "Ukshin Hoti", Prizren, Republic of Kosovo

² University of Prishtina "Hasan Prishtina", Prishtina, Republic of Kosovo
arber.hoti1@uni-pr.edu

Abstract—The challenges and problems that the educational programs are facing nowadays are those that previously have not been present, therefore, the solutions of these concerns should be compatible and reasonable in order to have a complete function of the educational institutions, especially the universities that are in transition such as University 'UH' of Prizren. The main reasons for addressing this topic through this paper are the ongoing discussions from students for not being able to learn enough during classes lectured by different professors in the Faculty of Economics. In order to get the most reliable results, this paper used the statistical program SPSS v.26 in which various methods such as descriptive statistics, factor analysis, reliability, linear regression, and One-Way ANOVA analysis are implemented. Moreover, this study shows the analysis of the connection and comparison of these methods. The results of this research are sustainable of e-learning services and the form of generating of the quality model. Further, the relationship of these models highlights among factors and provides a research foundation for elaboration in other contexts.

Keywords—eLearning, Covid 19, SPSS, university, student

1 Introduction

During the last year, one of the major problems was the COVID-19 pandemic that affected all spheres of our lives. Therefore, as part of University staff, this paper tries to show the effects of this pandemic and the impact that the use of electronic platforms has reached. Moreover, this study shows how many students and professors have achieved random requirements by diving them into four sections explained in methodology.

The main focus of this research is to indicate problems of online learning during the pandemic period by using e-learning services by the students and academic staff and also showing the dissatisfaction of these parts of research who have been the most affected ones. This shows the best that during recent months, there has been an important increase in infections of Covid-19, and the world has witnessed the way how this pandemic has affected a significant number of individuals all around the world.

Although the statistics are not certain yet, some studies have been reporting that this issue may exist in about three more years [1], [2]. So, the main purpose of this paper is to show the effects of E-learning on higher education specifically at the University of Prizren “Ukshin HOTI”. This analysis is done with online surveys including three generations, first, second and third year of study. Furthermore, different subjects taught by many professors at the University of Prizren are included.

This pandemic has impacted various aspects of tuition, for instance, the formal model and traditional design of the academic and professional education programs by dividing them and by also bringing new challenges [3]. Suddenly, teachers were compelled to transfer to an electronic form of education, and this is reported by [4], in his research. The abrupt transition to online learning on an unexpected and not experimented extent caused disorder and uncertainty in numerous schools since they were not prepared and there was not enough time to do so [5], [6], [7]. E-learning was one possible learning approach that could be applied to conduct the educational procedure online during the COVID-19 pandemic. E-learning may help the education process since it can be accessed at any time and from any location without being limited by place or time. However, using this platform contains some disadvantages, too.

The main problems that students and teachers may encounter are the students’ lower motivation, no proper students’ engagement, and the missing communication between students and teachers. If carefully examined, all students have risen their ability to take decision behind the choice of an e-Learning platform and to gain more knowledge at the same time [8]. Another main problem of using the platform of online learning is the family conditions for which students depend on. It has been shown that there are two aspects of family concerns when its members have to use e-Learning.

Firstly, the financial conditions and incomes that deal with their ability of having the devices needed to join virtual classes, and secondly, the space they use during online learning that may be insufficient or small for students as well as facing internet connection problems [9]. E-learning platform has developed the facilities like chatting, screen sharing, and recording by making the video conferencing systems able to offer online communication for audio gatherings, video chat, and presentations.

For instance, universities and colleges in Kosovo have been holding the courses online while utilizing a range of video conferencing systems, including Google Meet, Zoom, Blue Jeans, and BigBlueButton [10].

This paper is organized as follows. In Section II, the research methodology which is divided in some different part of explanation will be discussed. The discussion of literature review is written in section III. In section IV, results and discussions of the paper are shown, and lastly, the paper finishes with the conclusion.

2 Literature review

In the literature, several studies have addressed the challenges associated with the introduction of e-Learning. According to Emmanuel Aboagye, et al [11], although

engaging students in this pandemic era can be appropriate to keep them active and busy with studies, there are a lot of other challenges that should have been addressed before the pandemic era. Even the most powerful educational institutions and their students were forced to accept the new forms of learning by challenging themselves into adopting the online platform which was not used at such a high level of usage before, this problem is also identified by [12]. In different places, this pandemic has affected routines of activities, for instance, the Philippines Universities have been affected by this pandemic for which according to Ronnie E. Baticulon et al. [13], it has been shown that medical students, like students of other major confronted technological, individual, domestic, institutional, and community barriers were influenced as they tried to adapt to online learning. Some of these barriers are transient and expected to resolve with the global health crisis, others may persist or have long-term repercussions. Joi L. Moore et al. [14], propose an implementation of a mixed-method analysis of research articles to find out how they define the learning environment. To show the achieved results, 43 people have been survived and they discovered that there was inconsistent use of terminology for different types of delivery modes. In addition, the results revealed that there are different expectations and perceptions of learning environment labels such as distance learning, e-Learning, and online learning. Other research analyses propose to use different platforms such as Google Meet and Quiz Application to make learning more attractive for students. This happened for other levels of education such as elementary schools. Moreover, the authors used Indonesia, as a study case, which during the pandemic period time has encouraged students to learn more by having teachers or professors using quizzes applications to measure the knowledge of students even when it runs with any problem [15]. According to [16], it is shown that learners who were required to instantly adjust to distance education in the unexpected situation may be unaware of cyber security for which did not have enough time to adapt changes on their protecting way from this threat. E-learning enables teachers to reach a wider audience and deliver a more consistent message to their intended audience by making all students acquire the same information. Nonetheless, notwithstanding the growing spread of virtual learning, this method of acquiring knowledge has its drawbacks, too. A particular number of people tend to not use this method. Moreover, the highest proportion of students chooses classroom learning considering it more realistic and being able to communicate and talk with each other when they are in class [17]. Furthermore, distance education during an emergency may be extremely stressful for learners. However, there are various methods that can be used by learners so they achieve success in learning while facing this crisis. Some aspects of adapting the methods that appeared are having a good space and timing to learn, supporting each other, meditating or praying, working skills, reaching educators, and so on [18]. Moreover, according to the participants' results, the Coronavirus pandemic had a negative impact on learners' participation during e-learning due to the emergency situation characterized by various difficulties throughout the education process. For instance, some of the obstacles faced at this period were the issues related to infrastructure, culture, and digital inequality. Additionally, there were issues related to digital privacy that resulted in a negative impact on student participation in emergent distant education [19]. In order for these obsta-

cles to be solved appropriately, it has been suggested that regulators, especially schools, need to develop broad programs in order to inform and educate learners on how to use e-learning [20]. Finally, the suggestions given to the management team are to establish knowledge on the significance of E-service, content, and use quality, as well as user satisfaction to effective use of virtual learning platform [21].

3 Methodology

This study used the quantitative method in which students have been able to evaluate each question by giving a certain weight to the answers provided by them known as the Likert scale method. The survey was prepared by using Google Forms that was shared through official e-mail addressed to all learners who study in University “Ukshin HOTI”, Prizren. To analyze the results, the statistical program SPSS v.26 has been used in which various methods such as descriptive statistics, factor analysis, reliability, linear regression, and One-Way ANOVA analysis will be taken to analyze the data from the shared questionnaire.

3.1 Research questions

To be more accurate, several research questions have been increased. These questions will be answered in the results and experiments part and then compared. These two research questions are given below:

- R1: Do students differ based on their academic level and does age impact it?
- R2: Given the social impact that the C-19 has had so far, has it made the difference between students, knowledge of technology, and the academic preparation that students can have?

3.2 Hypotheses

According to the literature review and the papers, in this reviewed process, we increase four hypotheses and they will be proven (accepted, supported or rejected through different techniques based on the achieved results.

- H1: The academic part affects the effectiveness of online learning;
- H2: The technological part affects the effectiveness of online learning;
- H3: The social part affects the effectiveness of online learning;
- H4: The academic part, the technological part, and the social part have a mutual effect on the effectiveness of online learning;

Initially, the descriptive analysis will be used to describe the sample as well as to find basic statistics such as mean standard deviation for all variables.

3.3 Primary data

The primary data is the questionnaire prepared on the use of digital platforms at the University "Ukshin HOTI", Prizren. The questionnaire is based on Emmanuel Aboagye et al. [11], however, these questions are appropriately adapted for students of the University of Prizren.

The questionnaire is divided into four parts such as Effectiveness of Online Learning, Academic Part, Technological part, and Social Part. In focus, we have addressed the challenges of using services such as Google Meet, SMU (University Management System), Google Classroom, Google Calendar, and other web services which are mainly used for quizzes, tests, and other forms depending on the teachers.

A total of 26 questions were asked and out of these questions, we have 198 respondents, both male and female gender from different ages within the bachelor studies.

Except for demographic information, all other questions are measured according to the Liker scale.

3.4 Secondary data

In order to show the real situation, we will use different research, for example, scientific papers, research, reports, and different results which will have a foundation with the developed material. These materials will focus on the most powerful and credible databases so that the research to present the real situation. Also, the reports issued by the University itself will be taken as a basis of the development process in this time period.

This will help us generate the current state or state-of-the-art. The extracted materials will be mainly focused on getting them in databases such as ACM, IEEE, Scopus, Web of Science, Scopus, DOAJ, etc. Moreover, we will try to get away from sources that are not secure and that are published on platforms that do not have a secure source. This will help us to generate more accurate and clear information, and also data in our work.

4 Findings and analysis

In this section, we have shown the results are gained by using SPSS. Moreover, we have tested the hypotheses and the results are shown below. As mentioned in the methodology part, we used linear regression technique, factor analysis, and One-Way ANOVA to see if the hypotheses are supported, accepted, or rejected. The questionnaire is divided into four parts such as Effectiveness of Online Learning, Academic Part, Technological Part, and Social Part.

4.1 Descriptive statistics

Table 1 presents the frequency distribution for gender and age. In total, 198 students have participated in our research. Of all students, 13.1% are males and 86.9% are females. 76.3% of students are under 22 years old, 16.2% of them belong to 22-27 years interval and only 7.6% are older than 27 years.

Table 1. Frequency distribution (n=198)

	Variables	Frequency	Percent
Gender	Male	26	13.1
	Female	172	86.9
Age	Under 22	151	76.3
	22-27	32	16.2
	Over 27	15	7.6

Source: Authors'

In order to test the validity and reliability of the scale, we have performed factor analysis and reliability analysis. Table 2 provides the results of factor analysis. The value of KMO of 0.938 shows that the data set is suitable for running the factor analysis. Total Explained Variance is 68.025 and this value is high enough. Our scale consisted of 26 questions, but two of them were removed due to low factor loadings. Therefore, factor analysis proceeded with 24 items.

When using the varimax method, four factors were obtained at the end of the factor analysis. The first factor has 9 items, for instance, "Online learning cannot achieve student objectives", "Online learning environment is not motivating", etc. and these items are related to the effectiveness of online learning. Therefore, the first factor is named "Effectiveness of Online Learning", then, the second factor has 7 items, for instance, "Course materials are unclear and submitted late", "Professors are not trained to teach online", etc.

These items are related to the academic part of the professors, therefore, this factor is named as "Academic Part". The third factor has 4 items such as "The technology that has been used has serious problems in access, and it is often unavailable", "Problems with the operation/access to lectures", and so on. These questions are related to the technological part of online learning, therefore, this factor can be named as the "Technological part". Finally, the fourth factor also has 4 items. Two of them are "Online learning is very personal", and "Lack of communication between students". These questions are related to the social part of the interaction between students, so this factor is named as "Social Part".

The Reliability Statistics in Table 3 shows the reliability coefficient of the study. The Alpha coefficient for the overall scale that includes all questions is 0.952 and this value indicates that the scale used is very reliable. Furthermore, the reliability of each factor obtained from the factor analysis is tested. The Alpha reliability coefficient for the Effectiveness of the Online Learning Factor is 0.928 indicating that this factor is reliable to a high degree. The reliability coefficient for the Academic Part Factor is 0.895 and this value indicates that this factor is very reliable.

The reliability coefficient for the Technological Part Factor is 0.903, and this indicates that this factor is very reliable. The reliability coefficient for the Social Part Factor is 0.764 and this value indicates that the reliability of this factor is quite high. Hence, we can say that our scale is valid and reliable at the same time.

Table 2. Factor analysis results

KMO	.938			
Total Explained Variance	68.025			
	1	2	3	4
Learning on internet cannot achieve student objectives	.775			
The online learning environment is not motivating	.771			
Online lectures are as not effective as physical lectures	.767			
I miss the personal motivation to learn on internet/ online	.766			
Online lectures are boring for me	.742			
I prefer that learning through internet to stop	.729			
From the beginning of pandemic, my average mark is decreased due to online learning	.646			
I prefer the semester to postpone	.600			
Made students more isolated during the online learning period	.559			
Course materials unclear and submitted late		.779		
Professors are not trained for online learning		.720		
Lack of reading skills during online learning		.698		
Professors have troubles providing online learning assistance		.678		
Lack of good writing skills		.677		
Lack of effective communication skills during online learning		.600		
Low quality of online materials		.478		
The technology used has serious access problems and is often unavailable			.801	
Problems with functioning / access to lectures.			.788	
Some accessories (phones or laptops) are not suitable			.777	
Accessing problems to teaching materials			.678	
Learning online is very personal				.764
Lack of communication between students				.632
Lack of group discussions when solving tasks				.596
Learning online is incredibly indirect				.557

Table 3. Reliability analysis results

	Cronbach's Alpha	N of Items
Overall reliability	.952	24
Effectiveness of Online Learning	.928	9
Academic Part	.895	7
Technological Part	.903	4
Social Part	.764	4

4.2 Hypotheses testing

H1: The academic part affects the effectiveness of online learning. To test this hypothesis, we have used linear regression analysis. The model summary ($R^2=0.483$) in Table 4 shows that the Academic Part (AP) explains 48.3% of the change in Effectiveness of Online Learning (EOL) and this regression model is significant ($F=183.249$, $p=0.000$). The coefficient of AP has a significant effect on EOL ($\beta=0.797$, $p=0.000$). Consequently, we support our first hypothesis.

Table 4. Results of regression analysis for effect of AP on EOL

Dependent Variable	Independent Variables	B	T	p	F	Model (p)	R	R ²
EOL	Constant	.956	5.289	.000	183.249	.000	.695	.483
	AP	.797	13.537	.000				

H2: The technological part affects the effectiveness of online learning. For the second hypothesis, we have used regression analysis, too. The model summary ($R^2=0.411$) in Table 5 shows that Technological Part (TP) explains 41.1% of the change in Effectiveness of Online Learning (EOL) and the regression model is significant ($F=135.506$, $p=0.000$). The coefficient of TP has a positive and significant effect on EOL ($\beta=0.669$, $p=0.000$). On account of this result, the second hypothesis is supported.

Table 5. Results of regression analysis for effect of TP on EOL

Dependent Variable	Independent Variables	β	t	p	F	Model (p)	R	R ²
EOL	Constant	1.096	5.582	.000	135.506	.000	.641	.411
	TP	.669	11.684	.000				

H3: The social part affects the effectiveness of online learning. Similarly, to test the third hypothesis, we have used regression analysis. The model summary of regression analysis ($R^2=0.390$), in Table 6, shows that Social Part (SP) explains 39% of the change in Effectiveness of Online Learning (EOL) and the model is significant as a whole ($F=125.203$, $p=0.000$). The coefficient of Beta shows that Social Part has an effect of 78.9% on the Effectiveness of Online Learning and this effect is significant ($p=0.000$).

Table 6. Results of regression analysis for effect of SP on EOL

Dependent Variable	Independent Variables	β	t	p	F	Model (p)	R	R ²
EOL	Constant	.796	3.460	.001	125.203	.000	.624	.390
	SP	.759	11.189	.000				

H4: The academic part, the technological part and the social part have a mutual effect on the effectiveness of online learning. After testing the individual effect of three factors on EOL, we tested the interaction of the three factors at once using regression analysis. The model summary in Table 7 shows that AP, TP, and SP explain 59.2% of the change on EOL ($R^2=0.592$) and this model is significant ($F=93.888$, $p=0.000$). When we check the coefficients, we see that AP has an effect of $\beta=0.432$, $p=0.000$, TP has an effect of $\beta=0.262$, $p=0.000$, and SP has an effect of $\beta=0.329$, $p=0.000$. Accordingly, the fourth hypothesis is supported.

Table 7. Results of regression analysis for the mutual effect on EOL

Dependent Variable	Independent Variables	β	t	p	F	Model (p)	R	R ²
EOL	Constant	.089	.440	.660	93.888	.000	.770	.592
	AP	.432	5.882	.000				
	TP	.262	4.036	.000				
	SP	.329	4.640	.000				

4.3 Differences on factors by gender and age

To test whether there is any difference in the factors obtained from factor analysis by gender, we have performed independent samples t-test. Table 8 provides the statistics of this test. Based on T and Sig values, we can see that only the Technological Part (TP) factor significantly differs according to gender ($t=-2.029$, $p=0.044$). If we compare the means for this factor, the mean of males is 2.8462 and the mean of females is 3.3110. This difference shows that female students have been facing more technical issues than male students. Therefore, only the hypothesis. ?? qka only ?

H: Technological part differs by gender is supported.

Table 8. Results of t-test for the differences on factor by gender

Factor	Gender	Mean	Std. Deviation	t	Sig.
EOL	Male	3.2607	1.24640	-.044	.965
	Female	3.2713	1.13389		
AP	Male	2.9725	.95620	.382	.703
	Female	2.8920	1.00777		
TP	Male	2.8462	1.22898	-2.029	.044
	Female	3.3110	1.06714		
SP	Male	3.2788	1.08242	.123	.902
	Female	3.2544	.92262		

To test the differences in factors according to age, we have used One-Way ANOVA. For the first factor, EOL, there is a significant difference between students under 22 years old and students over 27 years old ($F=8.115$, $p=0.000$). The mean difference is 1.06824 for $p=0.001$. This difference shows that students under 22 years have greater effectiveness of online learning than students over 27 years old. To this end,

hypothesis *H: Effectiveness of online learning differs by students' age is successfully accepted.*

For the second factor, there is a significant difference between students under the age of 22 years and students over 27 years old ($F=3.723$, $p=0.026$). The mean difference is 0.72785 for $p=0.019$. This difference shows that students under 22 years have greater academic part issues than students over 27 years old. In consequence, hypothesis *H: The academic part differs by students' age* is supported.

For the third factor, there is a similar difference between the upper groups and also a difference between students of age 22-27 and over 22 years old ($F=11.516$, $p=0.000$). The mean difference for the first group is 1.30894 for $p=0,000$ and for the second group is 0.93906, $p=, 0.12$. These differences show that students over 27 years old have greater issues on technological part than students under 22 years and 22-27 years. In as much as, the hypothesis *H: The technological part differs by students' age* is supported.

Finally, the results of One-Way ANOVA show that social part factor does not differ by age ($F=1,903$, $p=0,152$). In this case, hypothesis *H: The social part differs by students' age* is rejected.

Table 9. Results of one-way ANOVA for the differences on factor by age

Factor	F	Sig.	Difference	Mean Difference	Sig
EOL	8.115	.000	Under 22 years & Over 27 years old	1.06824	.001
AP	3.723	.026	Under 22 years & Over 27 years old	.72785	.019
TP	11.516	.000	Under 22 years & Over 27 years old 22-27 years & Over 27 years old	1.30894 .93906	.000 .012
SP	1.903	.152	/	/	/

4.4 Comparison of evaluation of two forms of learning

In order to achieve different statements that are divided into two forms of learning, online and physically, the results are taken just to compare in one subject (Human Resource Management).

The difference between the two parts of students is immense enough due to several cases which are explained in the analysis. If carefully analyzed, the students who failed the exam when doing it in the online form are 41, whereas there are 10 students who got the six mark, 8 of them got seven, 10 students got eight, 13 students got nine, and only 2 students got the higher mark. If we compare with physical learning, this one has more students who have achieved the higher mark. There are 7 out of 84 students who got ten, 6 students got nine, eight students got 8, 23 students got seven, and 9 of them got six. In addition, out of 84 students, 31 failed this exam.

As seen in Table 10, the level of pass ability in physical form is better than in electronic form. Figure 1 visually shows that the average passing rate for students who have attended online form is 6.40 indicating that it is a general passing grade. On the other hand, the average grade of students who learned in face-to-face form is 6.64 while having the same syllabus and teacher or assistant. Although this was a small

difference, yet, this shows that students have managed to gain more knowledge based on the semester evaluation obtained according to the final evaluation.

Table 10. Marks from two forms learning, e-learning and physically

(Marks)	Online	(Face-to-Face)
5	41	31
6	10	9
7	8	23
8	10	8
9	13	6
10	2	7

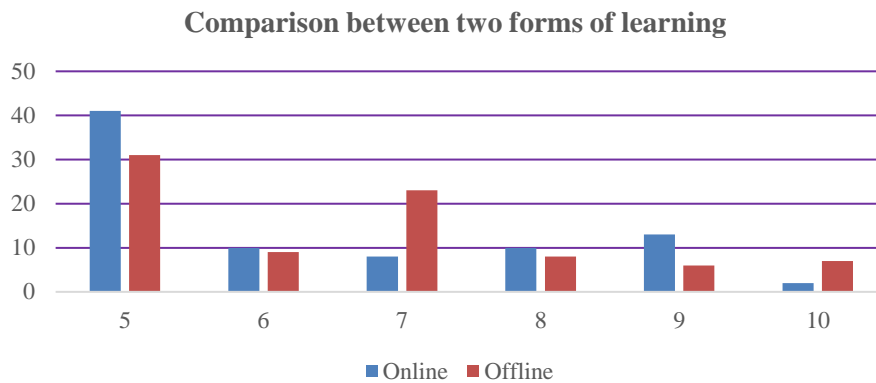


Fig. 1. Comparison between two forms of learning at University “Ukshin HOTI” Prizren

5 Conclusion

The current situation and the consequences that we carry as a society will continue to be present either in the emotional perspective or in the challenges that we continue to have in the recovery of the problems created so far. As a result, higher education institutions in the Republic of Kosovo have not been less affected in this regard, which have managed to create solutions to various current situations and then modify them as longer-term solutions, according to the experience that has been achieved in this direction. Although e-Learning used to be just evolving, with the pandemic situation, it got a very big boost and its use was a must for everyone. Students and teachers were very skeptical about this form of teaching, as the challenges were too great and the adaptation of teachers who were not familiar with the technology was an essential problem.

The present study analyses the perception of university students of the e-Learning form of learning before and during the COVID-19 pandemic. After testing the individual effect of three factors on EOL, we tested the interaction of the three factors at once using regression analysis. AP, TP, and SP explain 59.2% of the change on EOL

($R^2=0.592$) and this model is significant ($F=93.888$, $p=0.000$). When we check the coefficients, we see that AP has an effect of $\beta=0.432$, $p=0.000$, TP has an effect of $\beta=0.262$, $p=0.000$, and SP has an effect of $\beta=0.329$, $p=0.000$. If carefully seen, after evaluation of dataset, the factors obtained from factor analysis by gender we have performed independent samples t-test. This difference shows that female students have been facing more technical issues than male students. Besides, there is a significant difference between students under 22 years old and students over 27 years old. The mean difference is 1.06824 for $p=0.001$. This difference shows that students under 22 years have greater effectiveness of online learning than students over 27 years old. These differences show that students over 27 years old have greater issues on technological part than students under 22 years and 22-27 years.

Further, academic issues relationship between students of the age under 22 years and students over 27 years old show a significant difference. The mean difference is 0.72785 for $p=0.019$. This difference shows that students under 22 years have greater academic part issues than students over 27 years old. However, this is not the same in the technological part as the technological relationship between these age domains. Experience makes a person achieve things in a more professional way most of the time because he has gone through those stages and this gives the best results. Since there is a similar difference between the upper groups and also a difference between students of age 22-27 and over 22 years old ($F=11.516$, $p=0.000$). The mean difference for the first group is 1.30894 for $p=0.000$, and for the second group is 0.93906, $p=0.12$. These differences show that students over 27 years old have greater issues on technological part than students under 22 years and 22-27 years.

The findings of this study reflect the relationship of four models and how they can differ considering the results before (physically) of Covid-19 and during (e-Learning) this period. If we look at the results of students who have attended face-to-face learning, there is a better average of 6.64% out of 84 students who have been evaluated for each year. Whereas, if we look at students who have continued their activities in virtual form, there is a general decrease in the total assessment of an average of 6.40, this total value derived from the same number as physically.

The implication of the study shows a relationship between opportunities to learn remotely and using in the best form these tools. This form helps students and teachers to save their time and to do the same thing. It is clear that the way you can teach students in physical form, in the same way, you can use the same tools to teach them online, nothing can stop you from sharing the main information for what you plan to do on that day. Technology, in general, has impacted our daily lives even more by the methods and techniques of learning. Therefore, it is crucial that the whole society advances the knowledge on technology and on how we should use it.

Moreover, this paper contributes its most to show how the institution which we have taken as a case study has faced this period of time. Additionally, this is a good example of comparison with other different institutions on how to manage the “damages” of this experience that has never challenged us previously.

The limitations of this study were the lack of research and the form of presenting the results by using advanced software. Moreover, it is significantly important to mention that one of the main goals of this research's results was on getting correct answers from more respondents since in online mode everyone tries to finish the surveys, however, they are less likely to read it carefully and fulfill it.

In the future work, we plan to show the results of before, during the pandemic, and post-pandemic, the impact the form of learning and teaching in this and other public institutions had, and draw a comparison between them.

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7 Authors

Hamdi Hoti received his Ph.D. at the University of Tirana. He is an Associate Professor at the Faculty of Economics, University "Ukshin HOTI" Prizren. His research interests include Corporate Governance, Change Management, Human Resource Management, Scientific Research Methods, and Project Management. He is Vice Dean in the same faculty. The author can be contacted at hamdi.hoti@uni-prizren.com.

Arbër H. Hoti is a Teaching Assistant at the University of Prishtina "Hasan PRISHTINA", Faculty of Education. Also, he is pursuing doctoral studies at South East European University in Computer Science-Contemporary Technologies. His interests' research field are the Internet of Things, Machine Learning, and Artificial Intelligence, Behavior in Education and Social Science, where he has several papers indexed in digital platforms. Arbër (corresponding author) can be contacted at email: arber.hoti1@uni-pr.edu.

Edisona Kurhasku is a Ph.D. candidate in the Economics field at University "Hasan Prishtina", Prishtine. She has long experience on developing of marketing techniques especially in Republic of Kosovo where two of her thesis has to treat role and challenges in Kosovo's market. Also, she has several scientific papers which are focused on developing and finding new forms of the solution, especially in the marketing field. The author can be contacted at edisonakurhasku@gmail.com.

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