Online learning transition during the covid-19 quarantine in Greece

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Abstract
Purpose: Since the first restrictive measures in Greece were implemented in March 2020, due to the coronavirus pandemic (COVID 19), e-learning has become a dynamic part of people's daily lives with the prospect of remaining in the future. This study investigates the reaction of Greeks to this new educational reality.
Methods: A total number of 170 questionnaire responses were received from July 7, 2020 to October 20, 2020; the period where there was a relaxation of the restrictive measures between the two lockdowns in Greece. We investigated how the demographic factors: gender, age, occupation and place of residence influence the attitude of the respondents towards synchronous and asynchronous distance learning as well as their intention to continue using online education services in the future after the lifting of the restrictive measures. Additionally, we examine the customers' preferences concerning the most enjoyable distance learning experience, so that they will be available to the distance learning program designers. Descriptive statistical analysis and non-parametric statistical hypothesis tests were conducted in SPSS and R to draw our conclusions.
Results: Most of the respondents did not participate in online courses before the COVID 19 outbreak and prefer a combination of face-to-face learning and e – learning. Hypothesis tests showed us that there are statistically significant differences between users' preferences as well as with their demographic characteristics. Undergraduate and postgraduate university students continue to participate in online learning courses and are willing to invest money and time in this new educational process, unlike high school students who prefer face-to-face learning.
Implications: The present study will lead to practical implications, such as the formation of e-learning programs which aim for the best user experience and the best learning outcomes.

Keywords: *Covid-19, E-learning, Face-to-face learning, Reactions, Student experience*

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1   INTRODUCTION

In the present-day world, educational units are facing a The coronavirus disease (COVID-19) outbreak affects millions of people and threatens their lives all over the world. Most countries' governments have ordered a lockdown and asked people to stay at their homes due to the transmissibility of this new virus. Therefore, the COVID-19 outbreak has changed the working conditions all over the globe within a month. In the wake of the worldwide pandemic, most of the world's educational institutions have been affected ranging from economy, industries, religion and education among others. As a result, teachers and educators in many countries have started using e-learning.

Distance learning (e-learning) is defined as the acquisition of knowledge and skills using information and instructions, by using all communication and information technologies, as well as other forms of distance learning, which are contrasted

with face-to-face communication. Thus, e-learning is covered under a larger term of technology-based learning through websites, learning platforms, video conferencing, mobile apps, and many types of free available websites for blended learning technologies. Currently, e-learning is enhancing students' knowledge and is testing academic staff's and industry people's skills through the internet (Adams et al., 2018; Chopra et al., 2019). Most higher education institutions are providing online courses for their students within and off university campuses. Studies also show a mean growth 7.9% in e-learning annually worldwide. More specifically, the highest growth rate is in Asia at 17.3%, followed by Eastern Europe, Africa, and Latin America at 16.9%, 15.2%, and 14.6%, respectively (Rana et al., 2014).

Globally, due to the COVID-19 outbreak, schools and universities ceased their function and most teachers and students are happy by the move of the online education. All faculty members of many recognized universities have begun to get online certifications to deliver online teaching to their students. Currently, academic staff members and students are learning how to use the online learning platforms. Before this outbreak, face-to-face teaching mostly was used and this shift to the online courses has raised many queries on the quality of education (Sahu, 2020). Omotayo and Haliru (2020) also added that learners must be motivated to get digital competency for them to remain relevant in modernity and in crisis periods.

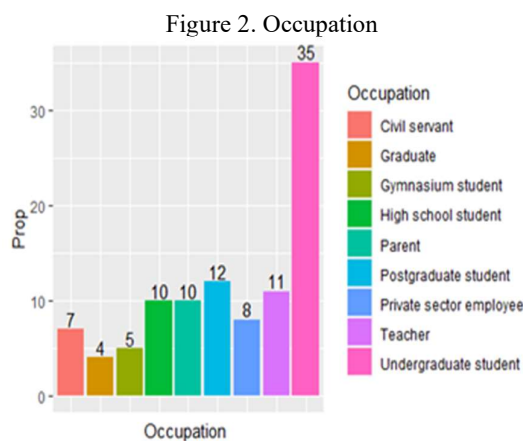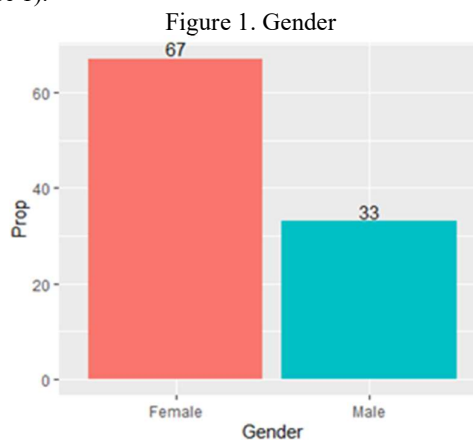## 2 ONLINE LEARNING: THE IMPORTANCE IN THE TIME OF COVID-19 CRISIS

The COVID-19 effects can be seen in schools, colleges, and universities. Subsequently, all this online learning platforms can be termed as a panacea for the crisis. The COVID-19 outbreak has made educational institutions to switch from the offline pedagogy mode to online pedagogy. This crisis will force the educational institutions (which had earlier a reluctance to change) to accept modern technology. This crisis will show us the lucrative side of the online teaching and learning and with the aim of the online teaching tools, we can coordinate many students at any time and in any part of the world. All institutions must use technology more aptly and many universities around the world fully use their digital operations understanding the imposed need of this current outbreak. Online learning is emerging as something innovative and has increased exponentially after the COVID-19 outbreak in the Greek universities. During this tough time, the concern is how academic institutions will be able to adopt online learning in such a massive manner (Carey, 2020).

Due to the modern requirements of a changing student population, with a variety of different demographics and increased operating costs, educational organizations are driven to find ways to become more productive in the methods of delivering their courses and educational services (Baker, WJ, and Gloucester, AS, 1994; Barnard, J., 1997). Technological developments look distance education to reduce the cost of building new facilities, while still serving a changing student population (Bothun, G. D., 1997). Finally, e-learning provides a crucial platform in crisis periods and also for people who are unable to complete their studies in

person (Eltayeb et al., 2020).

3 RESEARCH

The purpose of this quantitative research was to investigate how the COVID 19 pandemic influenced parent's and student's preferences over e-learning or face-to-face learning. Self-completion questionnaires were distributed via e-mail and social media, in order to achieve answers from all over Greece in a short period of time. The population was approximately 7,000,000 i.e. Greek nationals, aged 18 to 65. The survey was conducted between 7 July and 20 October 2020. Snowball sampling was used and is applied when it is difficult to access subjects with the target characteristics. In this method, the existing study subjects recruit future subjects among their acquaintances and sampling continues until data saturation (Naderifar, 2017). The 170 questionnaire responses comprised: 56 males (33%), 114 females (67%) (figure 1).

Figure 1. Gender

Figure 2. Occupation

The absolute (relative) frequencies of the occupation of the respondents are: 12 (7 %) civil servants, 6 (4%) graduates, 8 (5%) gymnasium students, 17 (10%) high school students, 17 (10%) parents, 20 (12 %) postgraduate students, 13 (8%) private sector employees, 18 (11 %) teachers and 59 (35%) undergraduate university students (figure, 2). As for the educational level of the participants, 82 (48 %) have a

bachelor's degree, 12 (7 %) are Gymnasium graduates, 35 (21%) are high school graduates, 39 (23 %) have a master's degree and 2 (1 %) are PhD holders.,

4   RESULTS AND DISCUSSION

Descriptive statistics summarize various aspects about our data, giving details about the sample and providing information about the population from which the sample was drawn. Each variable's type determines the nature of descriptive statistics that one calculates (Larson, (2006)).

An important question of the survey ("Have you participated in distance learning before the COVID-19 lockdown?") was focused on the information that shows that in Greece, e-Learning appeared to be not very popular before the COVID-19 lockdown. 79 (46 %) did participate in e-learning courses before the COVID-19 lockdown while 90 (54 %) did not. This comes in accordance to Edelhauser et. Al (2020) that the e-Learning concept appeared to be relevant only after the beginning of the coronavirus pandemic. One other relevant question shows that students (68 % of our sample, Table 1) have quickly migrated to online courses after the COVID 19 lockdown as well as in Edelhauser et al. (2020) and Kamal et al. (2020).

Table 1: Have you migrated to online courses after the COVID 19 lockdown?

Have you migrated to online courses after the COVID 19 lockdown?	Frequency	Proportion
Yes	116	68 %
No	52	31 %

Several questions were asked to trace out the learning status during lockdown that includes modes of learning, number of students participating in an e-learning course and average time in hours per day that an online course last.

Table 2: Questions to Trace out the Learning Status

Variables	Frequency (n)	Percentage (%)
Mode of learning		
Face-to-face learning	58	34.1
E-learning	27	15.9
A combination of the above	85	50
Number of students participating		
1	29	17.5
2-5	62	37.3
5-10	37	22.3
10-15	28	16.9
More than 15	10	6
Average time (in hours) per day of online courses		
0-1	31	19.7
2-15	122	77.7
15 and above	4	2.6

58 (34.1%) respondents prefer face-to-face learning, while 27 (15.9%) prefer e-learning. Also, 85 (50%) respondents prefer a combination of face-to-face learning and e-learning. This conclusion comes in agreement with Kapasia et. al (2020) where 88 (37.9%) respondents were continuing their study through textbook reading and digital e-learning, while 71 (30.6%) students were studying through reading textbooks by own effort and not participated in e-learning. Additionally, in the study of Abbasi et. al (2020) it was found that e-learning is perceived to have little impact compared to face-to-face learning as indicated by 86% of the participants. Furthermore, 62 (37.3 %) participants reported that prefer 2-5 students participating in a virtual classroom while 122 (77.7 %) participants spend 2 to 15 hours in online courses.

Singh A, Min AK (2017) did a study on the effectiveness of conducting digital lectures on gross anatomy. The study investigated student's satisfaction level towards e-learning, and it was found that majority of the students accepted digital learning. In our study (see figure 3), 69 (40.6 %) participants believe that e-learning is moderately effective compared to face-to-face learning, 42 (24.7 %) slightly effective, 29 (17.1 %) not at all effective, 24 (14.1 %) very effective and 6 (3.5 %) extremely effective. In Ana et al. (2020), 51% of the students expressed agreement related to e-learning preparation and 68% expressed their neutrality about the implementation of e-learning.

Adnan, M., & Anwar, K. (2020) found that the majority of the students (71.4%) feel voted against the notion that online learning is more motivating than face-to-face learning, which agrees with our statement.

In figure 4, 79 (47.6 %) of respondents who attended online courses, used Skype, while 54 (32.5 %) used other e-learning platforms. Furthermore, 44 (26.5 %) used Zoom, 35 (21.1 %) used Webex, 20 (12 %) used Facebook Messenger and 7 (4.2 %) used Viber. In Bahasoan et al. (2020) most of the respondents used the WhatsApp application followed by Google classroom.

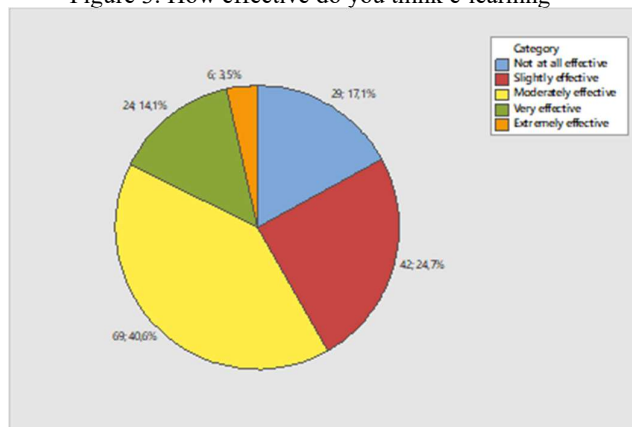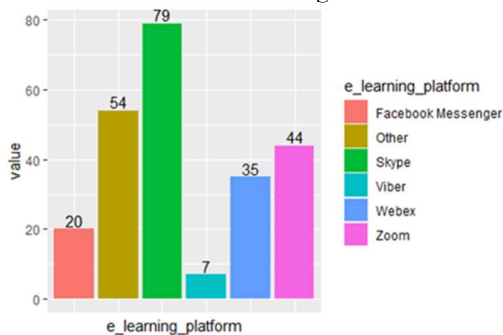Figure 3: How effective do you think e-learning

Figure 4: Use of E-learning Platform is compared to face-to-face learning?

The Chi-square statistic is a non-parametric (distribution free) tool designed to analyze group differences when the dependent variable is measured at a nominal level. Like all non-parametric statistics, the Chi-square is robust with respect to the distribution of the data (McHugh, 2013). Fisher's exact test is a statistical test used to determine if there are nonrandom associations between two categorical variables.

A Fisher's test was used, to examine if learning methods differ between the occupation of the participants. There was a statistically significant difference (p=0.042) between different occupations. Undergraduate students, postgraduate students, teachers and employees (civil servants and private sector employees) prefer a combination of e-learning and face-to-face learning while school students and parents prefer mainly face-to-face learning (Table 3).

Table 3: Preference of Learning Methods per Occupation

Occupation	What kind of course implementation do you prefer?		
	Face-to-face learning	E-learning	A combination
High school student	4 (2.4 %)	1 (0.6 %)	3 (1.8 %)
Lyceum student	9 (5.3 %)	1 (0.6 %)	7 (4.1 %)
Graduate	4 (2.4 %)	0 (0 %)	2 (1.2 %)
Undergraduate student	18 (10.6 %)	11 (6.5 %)	30 (17.6 %)
Postgraduate student	2 (1.2 %)	6 (3.5 %)	12 (7.1 %)
Parent	10 (5.9 %)	2 (1.2 %)	5 (2.9 %)
Teacher	6 (3.5 %)	0 (0 %)	12 (7.1 %)
Civil Servant	3 (1.8 %)	3 (1.8 %)	6 (3.5 %)
Private sector employee	2 (1.2 %)	3 (1.8 %)	8 (4.7 %)

A Fisher's test was calculated comparing the willingness of investing time and money in e-learning and the age group. A significant interaction was found (p=0.045). Respondents aged 18-30 are more likely invest in e-learning while respondents aged 45-60 are not open to a distance learning module (Table 4).

Table 4: Willingness of Investing Time and Money in E-learning

		Are you willing to invest time and money in e - learning?	
		Yes	No
Age Group	Under 18 years	13 (7.7 %)	10 (5.9 %)
	18-30	46 (27.2 %)	36 (21.3 %)
	30-45	28 (16.6 %)	11 (6.5 %)
	45-60	8 (4.7 %)	16 (9.5 %)
	Up to 60 years	1 (0.6 %)	0 (0 %)

The relationship between the participation in e-learning courses after the removal of the restrictive measures and occupation, was tested with Fisher's test. A significant interaction was found (p<0.001) resulting mostly undergraduate and postgraduate students (31 % and 10.1 % respectively) participate in e-learning courses after the removal of the restrictive measures.

A chi square test was calculated to test the relationship between the kind of course implementation that respondents prefer and the participation in e-learning courses before the COVID-19 lockdown. There was a statistically significant difference (χ^2(2) =7.492, p=0.024). Followers of face-to-face learning have not participated in e-learning courses before the COVID-19 lockdown while the exact opposite happens to the followers of e-learning. Respondents who prefer a combination between the two kinds, slightly haven't participated in e-learning courses before lockdown.

Table 5: Relationship between Preference of Course Implementation and Participation in E-learning Courses after the Removal of the Restrictive Measures

		Have you participated in e-learning courses before the COVID-19 lockdown?	
		Yes	No
What kind of course implementation do you prefer?	Face-to-face learning	20 (11.8%)	37 (21.9%)
	E-learning	18 (10.7%)	9 (5.3%)
	A combination	41 (24.3%)	44 (26.0%)

Next, we tested the relationship between the questions "Do you think that the COVID 19 pandemic outbreak pushed e-learning to gradually replace face-to-face learning?" and "Do you participate in e – learning courses because you do not have access to face-to-face learning?". The chi square test was used (χ^2(1) =4.571, p=0.033) and there exists statistical significance. Respondents who believe that e-learning will gradually replace face-to-face learning, participated in e-learning courses due to lack of access to face-to-face learning (47.9 % of the participants of our survey).

The Kruskal-Wallis test (Kruskal and Wallis, 1952) is the nonparametric equivalent of a one-way ANOVA and is used for testing whether samples originate from the same distribution and test the relationship between a nominal independent variable and an ordinal (or numeric) dependent variable with more than three groups.

A Kruskal – Wallis test was used to assess if there was a statistically significant difference in the respondents who, depending on their educational level, are willing to invest time and money in distance learning, Statistical significance exists (χ^2(4) = 10.440, p=0.034), with a mean rank score of

96 for Gymnasium students, 63.19 for Lyceum students, 92.12 for Bachelor's degree holders, 87.55 for Master's degree holders and 101.5 for PhD holders. These findings indicate PhD holders and university graduates are more willing to invest time and money in distance learning.

The Mann-Whitney U test is a statistical test that compares two independent groups that do not require large normally distributed samples (Nachar, 2008). This test was used to assess if there was a statistically significant difference in the effectiveness of distance education compared to face-to-face learning, depending on the perception that due to the COVID 19 outbreak e-learning will gradually replace face-to-learning. Statistical significance exists (U = 2264, p=0.031). There is a mean rank score of 90 for the respondents who believe in this transition and a mean rank score of 72.73 for the others. We conclude that respondents who believe in the replacement of face-to-learning from e-learning believe also that distance education is very effective.

5   CONCLUSIONS

As the COVID 19 pandemic is an unprecedented event for the global community, the educational community was taken by surprise by the restrictive measures. The conversion of face-to-face learning to distance learning, tried to immediately cover the education deficit that occurred at all levels of education. Given these circumstances, we find that respondents have in mind the distance learning courses they encountered during the first quarantine rather than the organized e-learning platforms that few educational organizations had at that time. Even large universities faced serious problems by this violent transition and especially with the students assessment during the June-July examination period, which had to be carried out online and remotely. In primary and secondary education, due to the limited experience of the teaching staff, students and parents, public distance education, slowly entered in the daily lives of students and teachers. The above shortcomings and the non-compulsory attendance of the school courses by the students, contributed to the fact that many students attended a few virtual classes from public school, which led to a large reduction of the examined material in the Pan-Hellenic courses. This situation is reflected in the findings of the research, as Webex, which is the official platform of the Ministry of Education of Greece, shows lower usage rates than Skype and Zoom.

In our quantitative research, a sample of 170 from all Greek territory was used. A large amount of the respondents has migrated to e-learning from the conventional learning and most of them participated in distance learning before the COVID-19 period. A combination of the two modes of learning is widely preferred by the Greek people and concerning the effectiveness of e-learning, it is considered moderately effective besides the traditional face-to-face learning. Additionally, university students, teachers and employees prefer a combination of e-learning and face-to-face learning while school students and parents prefer mainly face-to-face learning. Respondents aged 18-30 are more likely to invest in e-learning while respondents aged 45-60 are not open to e-learning. Also, after the removal of the

restrictive measures mostly undergraduate and postgraduate students (31 % and 10.1 % respectively) participate in e-learning courses, comparing to other occupations. Followers of face-to-face learning have not participated in e-learning courses before the COVID-19 lockdown while the exact opposite happens to the followers of e-learning. About the investment of time and money in distance education, mainly PhD holders and university students are ardent supporters.

The short period of time was one of the major limitations of this research study. Future researches should either increase the sample size in a larger time period and focus on the preferences of the educational community after the COVID-19 period. Furthermore, a study on the amount of money that is preferable to be invested in e-learning, is recommended.

The one-sample Wilcoxon signed rank test can serve as a test for symmetry if the median is known (O-Thas et al., 2005). This non-parametric statistical test was used to test if:

•   the median (desired by the respondents) duration of a learning course is 60 minutes. The test indicated that the median time was not significantly different from 60 minutes (Z=0.099, p=0.922)

•   the daily median duration of a learning course is 3 hours. The test indicated that the median daily time was not significantly different from 3 hours (Z=1.541, p=0.123).

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