

# Assessment of Greek High School Students towards Distance Learning, during the First Wave of COVID-19 Pandemic

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## Abstract

**Introduction:** COVID-19 pandemia induced dramatic consequences worldwide bringing also enormous changes and trends in the field of education. Teachers and students were found quite unprepared with the arrival of the first COVID-19 wave, in March, April, May 2020 in Greece, as regards the immediate and obligatory implementation of distance learning through modern/advanced net technologies. **Aim:** To study and analyze statistically the assessment of secondary school students, on how they received distance learning, during the first outbreak of COVID-19 pandemia. **Method:** We conducted a quantitative research with a properly structured questionnaire which was filled in by 462 high school and senior high school students (both in general and vocational education sectors) after the school's "reopening". The proposed questionnaire was focused on three different groups of project questions. Following the reduction of factor variables by using factor analysis, the important parts were further looked into, with the help of the chi-square method. **Results:** 33.5% of the students were very satisfied with the distance learning. 18.2% of this group was interested in modern distance learning ( $P < 0.001$ ), while only 12.3% of those considered asynchronous distance learning (exercises and material) ( $P < 0.001$ ) as an interesting approach. In addition, 23.8% reported that teachers had difficulty in implementing distance learning ( $P < 0.001$ ). 78.1% of the students were actually dissatisfied with the degree of their theoretical knowledge improvement ( $P < 0.001$ ), while only 0.2% reported an improvement in laboratory lessons ( $P \leq 0.05$ ). A 13% of the students wished future implementation of distance learning. Of those, only 6.9% were satisfied with digital education ( $P < 0.001$ ) and only 2.8% believed that conventional teaching can be enhanced in the future with distance learning ( $P < 0.001$ ). **Conclusions:** The majority of students were not satisfied with the distance learning, believing that they had not received the degree of the expected ben-

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enefit in terms of knowledge and skills. Therefore, distance learning seems, for the time, being not favored, by them, for its future implementation.

### Keywords

Distance Learning, E-Learning, Distance Education, COVID-19, Pandemic in Greece, Asynchronous Education, Synchronous Education, E-Learning Platforms

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## 1. Introduction

COVID-19 outbreak in China in December 2019 (Cao et al., 2020). After the WHO (World Health Organization) declared the coronavirus outbreak as a pandemic in early March 2020, many E.U. countries began closing schools to curb the spread of the virus, despite having limited information on the best course of action in that respect.

SARS-CoV-2 appeared firstly in Greece on 26 February 2020. After the ninth contagion case, the government announced that educational institutions in specific regions should close down for a period of 48 hours (March 5-6) (“COVID-19: Schools closure”, Naftemporiki, 2020). On 10/03/2020 the confirmed cases reached the number of 89, and the Ministers of Health and Education jointly decided to close down all schools in the country for at least 14 days. In the end, schools closed for two months from 11/03/2020 (Official Gazette B’783/10-03-20) to 07/05/2020 (Official Gazette B’1739/06-05-20), while senior high schools were to reopen. Despite the huge efforts of the state, until the summer holidays (30/06/2020) 3409 infection cases were detected with the death toll reaching 192 in total (N.P.H.O. of Greece, 2020). It is worth mentioning that before the school reopening, all necessary hygiene protocols were followed (Official Gazette B’2026/27-05-20), such as keeping distance between desks, a minimum/maximum number of students, etc. Despite the innumerable drawbacks of the pandemic, vital decisions were made and the country’s digital development was quickly organized.

Thus, school closure created great necessity for distance learning as a new educational tool (Sofos, Kostas, & Paraschou, 2015). Additionally, senior students were obliged to continue their preparation for University entrance exams, taking place at the end of each school year. E-learning started on 16/03/2020 as a pilot program in three regions (Distance Learning, Ministry of Education, 2020) and was then extended to all high schools in Greece. Priority was given to senior high school students. The response of both students and teachers to online e-learning was considered impressive (Table 1) (Statistics on distance learning, Ministry of Education, 2020).

Furthermore, although less than 5% of COVID-19 cases internationally involve E.U. countries, the role of children in transmitting SARS-CoV-2 remains unclear. The latest data shows that children can be infected and transmit the virus to family

members (COVID-19 in children and the role of school settings in transmission, E.C.D.C., 2021). Other countries of the European Union (Table 2), except Sweden (Naftemporiki, 2020), adopted similar measures. The re-opening of schools, after summer holidays, however, coincided with a period, where a sharp increase in coronavirus cases across Europe occurred, thus raising concerns about a new pandemic.

**Table 1.** Participation of secondary school students and teachers in digital education during the lockdown.

Synchronous distance learning	Number of students/teachers	Percentage
Student participation in digital classes *	766.458/1.366.936	56%
Teacher participation in digital classrooms *	112.872/130.515	86%
Asynchronous distance learning	Number of students/teachers	Percentage
Student participation in asynchronous education **	1.114.504/1.366.936	82%
Teacher participation in asynchronous education **	115.618/130.515	89%

\* via the Cisco-Webex digital platform. \*\* via the website of the Hellenic Ministry of Education e-class. Universities use the same website.

**Table 2.** Dates of reopening of schools in the European Union and protective measures for students during lessons. At the end of each country, there is a number corresponding to a specific reference.

Countries	School opening date	Protective measures after opening of primary and secondary schools
Greece (Kathimerini, 2020)	14/09/2020	Use of mask in all school areas. Use of antiseptics. Different breaks.
Spain (Morris, 2020)	Some schools open since 07/09/2020	Keeping distance (at least 1.5 m), school facilities are disinfected at least once a day, while toilets are cleaned three times a day.
France (McAuley, 2020)	01/09/2020	Teachers and students over the age of 11 should wear masks in all areas, unless a minimum distance of 1m is kept.
Belgium (Naftemporiki, 2020)	01/09/2020	Use of mask over the age of 12.
Denmark (Naftemporiki, 2020)	10/10/2020	10 - 12 students in each classroom who keep a distance of 2 m from each other and must wash their hands every hour and a half, while the use of mask is not mandatory.
Britain (Barr, 2020)	First week of September	Use of mask by all students.
Italy (Orlandi, 2020)	14/10/2020	Use of mask is mandatory upon arrival at and departure from school, but not in the classroom, if the appropriate distance is kept. 40.000 extra teachers were hired and schools were provided with single desks to ensure distance.
The Netherlands (Naftemporiki, 2020)	10/08/2020	Students are not required to keep distance. Some schools require older students to wear masks in the hallways due to lack of space. Older students keep distance (1.5 m) from teachers (Alfavita, 2020).
Germany (Godin, 2020)	07/08/2020	Use of mask for students over 15 years of age. North Rhine-Westphalia is so far the only state making the use of mask compulsory in schools, while students in states such as Berlin should only wear it outside the classroom.
Poland (Bretan, 2020)	01/09/2020	Authorities do not impose the use of mask neither have they reduced the number of students in classrooms, children are asked instead to wash their hands often and to avoid gathering in large groups.
Sweden (Naftemporiki, 2020)	20/08/2020	Masks are not mandatory and each school is responsible for enforcing the regulation.

outbreak, in relation to a possible flu outbreak in winter. European countries have taken different measures concerning the opening of schools (**Table 2**).

Covid-19 pandemic is actually the biggest challenge facing education systems worldwide and is obviously directly related to distance learning. A literature survey has shown that international research and experiments carried out on Covid/Education have been investigated similar items, such as:

- Stress and the psychological impact of the COVID-19 epidemic on college students (Cao et al., 2020).
- Realistic guidances especially written for teachers, students, parents and institutions on how to manage distance learning during COVID-19 (Daniel, 2020).
- The distance learning as a panacea (one and only solution) during COVID-19 crisis (Dhawan, 2020).
- Online learning experiments in secondary schools during the Coronavirus crisis (Anouti & Rouadi, 2020).

Thus, above global concerns, led us to further investigate this new educational situation, attempting to reach the following key points:

- How Greece authorities applied distance learning, for the first time in Greece?
- How was the student's e-learning experience during the first months of quarantine?
- What do students think that should be the future of e-learning?

Greece followed common practice as implemented to other E.U. countries during the pandemic, in accordance with the recommendations of the W.H.O. However, Greece differs from other E.U. countries in educational issues. Due to its geological morphology, in accordance to large number of small islands, Greece consists of a disproportionately large number of small schools, regarding its population. In addition, the project team is Greek. The reason both junior and senior high schools were chosen, was that distance learning took place only in these schools during first pandemic phase. Primary education started distance learning later.

## 2. Objectives and Methods

### 2.1. Purpose of This Research

The purpose of this research is to investigate the attitude, views, thoughts and experiences of junior and senior high school students regarding how they evaluate distance learning during the first months of the quarantine (lockdown), with the main goal to suggest improving measures for an analogous future situation.

More specific, students were asked three main project questions:

- 1) How much they liked distance learning (degree of satisfaction)?
- 2) Which were the benefits of distance learning during the quarantine?
- 3) What the future of distance learning should be like?

### 2.2. Study Sample

Mixed schools were selected. The final sample consisted of a representative and homogeneous number of students in order to ensure the reliability and validity

of the research (Farmakis, 2015). The population of the research was made up of Junior High School students (aged 12 - 15 years) and Senior High School and Vocational High Schools students (aged 15 - 18). Vocational high schools which were attended by 100.000 students.

The survey was conducted of the prefecture of Attica (urban area) with a population of about 5.000.000 inhabitants and the island of Paros (semi-urban area) with a population of approximately 15.000 inhabitants.

Cluster sampling (Farmakis, 2015) was chosen as the sampling technique because we considered it as easier way to get in touch with the schools of an area than deal with all the students of the same area. The population consisted of schools from urban and semi-urban areas of Greece. The population for the urban area of Athens consisted of 17 schools-clusters, while the sample included 6 of them. The population for the semi-urban area (Paros Island) consisted of 6 schools-clusters and the sample included all 6 schools-clusters.

More specifically, 3 Junior High Schools - 3 Senior High Schools of the Prefecture of Attica (Athens) and 3 Junior High Schools - 3 Senior High Schools of the Prefecture of Cyclades (Paros Island) were participated in the present research.

The sample was 12 clusters (schools) and contained 12 (schools)  $\times$  3 (three classes [A, B, C] from each school)  $\times$  13 (students from each class) = 468 students. Of the 468 collected questionnaires, 6 questionnaires were not completed. Therefore, we collected a total of 462 questionnaires.

The survey was conducted in May and June of 2020 (Table 3).

### 2.3. Method: Questionnaire Design

We conducted a quantitative research, (Papanastasiou, 2021) with an appropriately designed and structured questionnaire used as a research tool (Isari & Pourkos, 2015). Questionnaires were distributed to all three classes of the junior and high schools (Table 3). In drafting the questionnaires, clear closed-format questions were used, employing plain language and providing further explanations where necessary. The questionnaires consisted of four parts (Table 4).

### 2.4. Validity Check: Reliability Check

The questionnaires, in the pilot phase, were distributed to 10 students of the Vocational High School (V.H.S) of Paros and were answered, while an investigator was present in the classroom, (for all necessary clarifications). The number of students was considered satisfactory for an impartial and unbiased submission of their views (Cohen et al., 2008). The reliability factor (Cronbach's alpha) was calculated to test whether the questions are highly consistent with each other (Markos, 2012). For the first question Cronbach's alpha was found to be  $\alpha = 0.82$ ; for the second,  $\alpha = 0.753$ ; for the third question,  $\alpha = 0.807$ . Variables/questions with  $\alpha < 0.3$  were removed, in order, to increase the internal consistency of the research questions.

**Table 3.** The total number of participants was 462 students.

Gender	Number of participants	Percentage
Girls	240	52.06%
Boys	222	47.94%
Schools	Number of participants	Percentage
Junior High Schools (6)	288	62.47%
Senior High Schools (6)	174	37.53%

**Table 4.** The structure of the questionnaire. The questions were on a Likert scale with the three graded answers being a little, enough, a lot. The time to complete the questionnaires was 10 minutes.

Parts	Type of questions	Number of questions
First	Demographics	3
Second	Level of students' satisfaction regarding distance learning	24
Third	Benefits from distance learning	18
Fourth	Students' opinion on the future of distance learning	17

## 2.5. Statistical Data Analysis

Data were analyzed using SPSS 25.0 (academic license). Initially, a descriptive statistical analysis was performed to display the demographic and other selected characteristics of the respondents. Factor analysis followed in order to reduce the variables research questions to only the important factors (Siomkos & Vasiliakopoulou, 2005). Factors are real latent (hidden) variables, which cause covariance between variables. The aim is to study all the existing variance, in order to extract the largest percentage of the variance from the least possible factors.

Furthermore, chi-square was applied to investigate the most important correlations between the variables that make up 1) the level of satisfaction, 2) the benefits and 3) the future of distance learning. The Kendall's tau<sub>b</sub> (correlation coefficient) was used for variables with a small number of data.

## 3. Results

Before each question, the variables/questions were analyzed with the methodology of factor analysis. The purpose was to check the interaction of the variables/questions with each other in terms of covariance, in order to focus on just a few variables that seem to play a major role in answering the above mentioned three project questions.

### Analysis results for the question "Satisfaction from distance learning"

Out of 24 questions related to the project question "satisfaction from distance learning", 11 have the highest correlation with a Factor Analysis Extraction value greater than 0.6 and a Kaiser Meyer Olkin statistical criterion value quite high, reaching 0.86. For each important variable of the first project question, its rela-

tionship with the variable “degree of satisfaction with digital education” was studied. For this instance, eleven (11) separate tables were made for each pair of variables, one of which is **Table 5**. The results from these tables were summarized and transferred to **Table 6**.

**Table 5.** The application of chi-square from the above table gave a value of  $<0.001$ , the differences are statistically significant. Most of the answers showed little satisfaction with the frequency of studying asynchronous education. With the application of an additional 10 similar tables, **Table 6** was created, as well as **Table 7** and **Table 8**.

		Frequency of study of asynchronous education			
		Little	Enough	Very	Total
<b>Degree of satisfaction with digital education</b>	Little	<b>121</b> 26.2%	51 11.3%	<b>36</b> <b>7.8%</b>	<b>209</b> <b>45.2%</b>
	Enough	48 10.4%	27 5.8%	<b>23</b> <b>5.0%</b>	<b>98</b> <b>21.2%</b>
	Very	49 10.6%	35 7.6%	<b>71</b> <b>15.4%</b>	<b>155</b> <b>33.5%</b>
	Total	218 47.2%	114 24.7%	<b>130</b> <b>28.1%</b>	<b>462</b> <b>100%</b>

**Table 6.** Evaluation of the results of the key questions/variables that determine the degree of satisfaction with e-learning. However, the variables that were included in the first factor (component) and are considered the most important in terms of the interpretation of the first research question are variables A1(\*)-A8(\*).

Student's profiles		Degree of satisfaction with digital education				Value <i>P</i> of $\chi^2$
		Little	Enough	Very	Total	
A1	They studied a lot the educational material of asynchronous education (e-class) *	36 7.8%	23 5%	71 15.4%	462, 100%	<0.001
A2	They found the online courses (Cisco WebEx) very interesting *	38 8.2%	42 9.1%	84 18.2%		<0.001
A3	They found the educational material and the exercises of asynchronous education (e-class) very interesting *	19 4.1%	19 4.1%	57 12.3%		<0.001
A4	They believe that distance learning has greatly enhanced conventional teaching *	11 2.4%	15 3.2%	29 6.3%		<0.001
A5	Digital education was very easy to use *	30 6.5%	26 5.6%	52 11.3%		<0.001
A6	Teachers have made great use of digital media*	23 5%	18 3.9%	66 14.3%		<0.001
A7	The teachers organized the lessons very well *	10 2.2%	24 5.2%	67 14.5%		<0.001
A8	Online training courses were a lot of fun. *	12 2.6%	17 3.7%	42 9.1%		<0.001
A9	The students were very familiar with on line education.	91 19.7%	65 14.1%	101 21.9%		<0.001
A10	The students were very familiar with asynchronous education.	55 11.9%	36 7.8%	68 14.7%		<0.002
A11	Teachers have had great difficulty with digital education.	113 24.5%	65 14.1%	110 23.8%		<0.001

Chi-square or Kendall's tau b statistical tests were applied to each data table (Tables 6-8). Chi-square was applied in cases where we had a large number of data per cell. Instead, Kendall's tau b was applied to correlations with little cell data.

**Table 7.** Students' answers to the most important questions concerning the research question "what are the benefits of distance learning". Only the "very" answers appear in the cells of the table.

Student's profiles	Benefits of distance learning & Improving knowledge				Value <i>P</i> of $\chi^2$
	Little	Enough	Very	Total	
B1 The educational material of asynchronous education was very interesting *	62 13.4%	18 3.9%	15 3.2%		<0.001
B2 The use of the educational material of asynchronous education had greatly improved the educational process *	27 5.8%	12 2.6%	8 1.7%		<0.001
B3 The educational material of asynchronous education was updated very often *	64 13.9%	21 4.5%	15 3.2%		<0.001
B4 Conventional teaching can be greatly enhanced by online education *	25 5.4%	17 3.7%	13 2.8%		<0.001
B5 They were very satisfied with the way the online training courses were conducted *	58 12.6%	26 5.6%	17 3.7%	462 100%	<0.001
B6 They showed great interest in on line education	109 23.6%	35 7.6%	20 4.3%		<0.001
B7 They were very satisfied with the computer skills which they acquired	31 6.7%	13 2.8%	11 2.4%		<0.001
B8 They were very satisfied with the skills they acquired in the laboratory classes	0 0.0%	0 0.0%	1 0.2%		0.05
B9 They consider the absence of a blackboard important	202 43.7%	44 9.5%	16 3.5%		0.663

**Table 8.** Student's answers to the most important questions concerning the research question "what is the future of distance learning". Only the "very" answers appear in the cells of the table.

Student's profiles	Positive attitude for distance education in the future				Value <i>P</i> of $\chi^2$
	Little	Enough	Very	Total	
C1 They showed great satisfaction from distance learning	105 22.7%	18 3.9%	32 6.9%		<0.001
C2 Their distance learning suits them to a great extent	22 4.8%	8 1.7%	19 4.1%		<0.001
C3 Conventional teaching with distance learning was significantly strengthened	25 5.4%	9 1.9%	21 4.5%		<0.001
C4 Theoretical knowledge has been significantly improved compared to classroom teaching	12 2.6%	7 1.5%	13 2.8%	462 100%	<0.001
C5 Great desire to conduct courses by teachers of the Ministry in the absence of school teachers	28 6.1%	5 1.1%	20 4.3%		<0.001
C6 Great flexibility of space	86 18.6%	21 4.5%	30 6.5%		<0.001
C7 Great flexibility of time	71 15.4%	13 2.8%	25 5.4%		<0.001

45.2% of the students were not satisfied with digital education. On the contrary, 33.5% of the students were very satisfied.

**Variable A1.** Among the dissatisfied students from distance learning, more than half 58% (121/209) answered that they had studied minutely the material of asynchronous education. Of the students who were very satisfied with the distance learning, about half (46%) answered that they studied the material of the asynchronous education to a great extent.

**Variable A2.** Among the dissatisfied students with digital education, almost half (48%) reported that modern distance education courses were of little interest. Of the students who were very satisfied with digital education, 54% believed that modern distance education was interesting.

**Variable A3.** 64% of dissatisfied students with digital education, reported that the material of asynchronous education was not of interest. The percentage of students who were very satisfied with the asynchronous education and at the same time found it interesting was around 36%.

**Variable A4.** The majority of the students (81%) who were not satisfied with digital education reported that digital education provided little to enhance conventional teaching. Of the very satisfied, 19% believed that digital education helped a lot in classical teaching in the classroom.

**Variable A5.** Among the dissatisfied students with digital education, the most reported (56%) that digital education was difficult to use. Of the very satisfied students, 28% considered it was difficult and 34% that it was easy to use.

**Variable A6.** Among the students who were dissatisfied with digital education, more than half (58%) reported that teachers did not take advantage of the platform (synchronous and asynchronous) to the necessary extent. Of all those who were very satisfied, 42% believed that teachers had maximum advantage of the digital education tools.

**Variable A7.** Most of the dissatisfied students from digital education (62%) reported that they were not satisfied with the way the lessons were conducted. Among the students who were very satisfied with digital education, 43% stated that they were very satisfied with the way the lessons were done.

**Variable A8.** Among the students who were dissatisfied with digital education, the majority (77%) considered that digital education was not fun. Of those who were very satisfied with digital education, only 27% said that there was some form of entertainment in this type of education.

**Variable A9.** Among the satisfied and dissatisfied students from digital education, a large percentage of them (65% and 44% respectively) considered that they were very familiar with this advanced form of education.

**Variable A10.** Among the students who were dissatisfied with digital education, almost half (44%) considered that they were unfamiliar with the asynchronous form of distance learning. (43%) of the very satisfied students reported that they were familiar with the asynchronous form of distance learning.

**Variable A11.** Among the satisfied and dissatisfied students from digital

education, the majority of them (71% and 54% respectively) reported that teachers faced a significant degree of difficulty in teaching.

#### **Analysis results for the question “Benefits of distance learning”**

The second project question concerned students’ opinion on whether digital education can improve the knowledge provided by conventional teaching. From a total of eighteen (18) questions related to the research question, eight (8) have the highest correlation with Extraction greater than 0.6 and a value of the statistical criterion of Kaiser Meyer Olkin quite high has 0.813 (Table 7). However, the results of Factor Analysis saw that the variables included in the first component and are considered the most important in interpreting the second research question. They are the five variables indicated by an asterisk (\*) in Table 7.

78.1% of students were dissatisfied with the degree of their theoretical knowledge improvement, while only 6.9% considered that they had seen improvement.

Furthermore:

**Variable B1.** 47% of students stated that theoretical knowledge had improved with digital education considered that this was attributed to the interesting material of asynchronous education. 53% of students who considered that their knowledge had not increased with digital education was attributed to the low interest material of asynchronous education.

**Variable B2.** Of the students who felt that their theoretical knowledge had improved with digital education, only 25% attributed it to the quality and usefulness of asynchronous education. Overall, 68.4% did not believe that their knowledge had improved with asynchronous education and this was attributed to the poor quality of asynchronous education.

**Variable B3.** Of the students who reported that their theoretical knowledge did not improve, almost half (48%) stated that the material on the asynchronous education website was not up to date, while from the same category more than 18% stated that the website was frequently updated. Of those who were very satisfied with the improvement of their theoretical knowledge, 47% stated that the e-class was very up to date. Overall, 46.1% of students reported that the material on the asynchronous education website was not up to date.

**Variable B4.** Of the students who were least satisfied with the improvement of their theoretical knowledge with digital education, 78% of the students reported that the classical teaching was slightly strengthened by distance learning. In contrast, of the satisfied students regarding the degree of improvement of their theoretical knowledge, 40% stated that classical teaching was strengthened by distance learning compared to 28% who claimed the opposite.

**Variable B5.** Of all students who reported that their theoretical knowledge had not improved, almost half (48%) were not satisfied with the way modern distance learning courses were conducted. Of the satisfied students regarding the improvement of their theoretical knowledge, 53% stated that they were satisfied with the way the modern distance learning courses were conducted.

**Variable B6.** Of the students who reported that their theoretical knowledge did not improve, the majority (70%) reported that modern distance learning courses were slight interesting. Of all those who reported improvement of their knowledge, 67% was attributed it to interesting modern distance learning courses. A total of 35.5% of students referred Cisco-Webex courses as interesting.

**Variable B7.** Of the students who thought that their theoretical knowledge had not improved, the majority (70%) reported that their computer skills had not been improved. Of those who believed that their theoretical knowledge had improved, almost half (44%) reported that their computer skills had not improved. Overall, 66.7% said that computer skills had not been improved with digital education.

**Variable B8.** Of all those who reported that their theoretical knowledge did not improve with digital education, 87% said that the same happened with their laboratory knowledge.

**Variable B9.** Although opinions on the educational impact of the lack of a board were not statistically significant, stated that 56% of students considered the absence of a board to be significant.

#### **Analysis results for the question “The future of distance education”**

The third project question concerned how students see the possibility of distance learning in the future. Of the 17 variables associated with the third research question, the most important are 7. The factor analysis method showed that its future will be depended (apart from the lockdown period which is a unique and necessary solution) on an important “factor” which is the “Thoughts formed by students during distance learning” and includes 7 variables. In these variables the extraction value of Factor Analysis is greater than 0.6 and the value of the statistical criterion Kaiser Meyer Olkin is quite high 0.769. The most important variables related to this query are those, summarized in **Table 8**.

76.2% of students did not wish the implementation of distance learning in the future, while only 13% considered it important form of education. Furthermore:

**Variable C1.** Of the students who did not wish distance learning to be implemented in the future, half of them (52%) were not satisfied with distance learning. Similarly, students who wished to implement distance learning in the future and were at the same time satisfied with distance learning constituted 53%.

**Variable C2.** The majority of students (80%) of all those who did not prefer distance learning in the future and almost half (42%) of those who wanted it, rejected distance learning as a possible future form of teaching.

**Variable C3.** The majority of students (79%) of all those who did not wish distance learning and 40% of those who wanted it in the future, reported that conventional teaching was enhanced by distance education to a minimum.

**Variable C4.** The majority of students both in case they did not wish distance learning and in case they wanted it, reported in percentages (83%) and (58%)

respectively that their theoretical knowledge improved to a minimum.

**Variable C5.** Of the students who did not want the implementation of distance learning in the future and of the students who preferred the future implementation of distance learning, the majority (82%) and (50%) respectively stated that they did not want courses to be taught by teachers of the Ministry lack of teachers of their school.

**Variable C6.** Of the students who did not wish the future implementation of distance education, almost half (49%) stated that they did not want to conduct lessons outside of school area. Of all those who wished future distance education, 50% preferred the courses to be held at their place.

**Variable C7.** Of the students who did not prefer the implementation of distance learning in the future, more than half (55%) did not like the freedom in terms of time offered by distance learning. Of all those who wished future distance learning, 42% liked the freedom in terms of time offered by distance learning.

## 4. Conclusions

### 4.1. Ability and Degree of Liking from Distance Learning

The degree of interest offered by distance learning is one of the key factors influencing student satisfaction (Komis, 2004). The majority of the students stated that e-learning platforms (A2) were not interesting and considered that the material of asynchronous distance learning was not well informed (A3). As a result, many students did not find their lessons particularly interesting (A1). The e-learning educational material is required to be interesting in order to attract the students' interest (Lionarakis, 2001). Students had difficulty in using the asynchronous distance learning platforms (A5) and teachers did not take full advantage of them (A6). The students were not satisfied with the way the modern distance learning courses were conducted (A7) obviously because teachers had difficulty in using it during their teaching (A11). Although many children had fun by using electronic media, they did not find e-learning to be just as fun (A8). The students were familiar with the modern form of distance learning because it was similar to other applications known to them (A9) but the same was invalid for the asynchronous distance learning.

### 4.2. Benefits of Distance Learning

In general, students reported that they did not benefit from distance education. In more detail, the majority of students expressed that their theoretical knowledge had not been improved. This was attributed to the lack of interest in both synchronous (modern) (B1) and asynchronous distance learning (B6), due to the non-updated educational material of the asynchronous education platforms (B3) and the poor quality (structure and content) of the educational modules (B2). This is also due to the short time available to teachers to organize all their teaching materials (Kritikou, 2015). In addition, students considered that the

progress of their education was more related to the quality of modern distance learning than to the material of asynchronous education (B5). They thought that classical teaching could not be significantly enhanced by distance learning (Mavrogiorgos, 2001) (B4), mainly because it was not suitable for laboratory training (Vocational high school students) (B8), in fact they considered that their computer skills had not been improved (B7). A significant disadvantage of digital education was the lack of the classic blackboard in the classroom (B9).

### 4.3. The Future of Distance Learning

The majority of the students would not like asynchronous education to be continued (C2) in the future and they judged this on their dissatisfaction with its implementation (C1). They stated that conventional teaching was not enhanced by distance learning (C3) and their theoretical knowledge had been improved slightly (C4). In addition, they declared that they did not prefer distance learning by teachers of the Ministry of Education in case of lack of teachers in their school (C5). They mentioned that they wish to conduct classes exclusively on the school installations (C6) and only during school hours (C7).

## 5. Discussion Recommendations

Distance learning is a difficult multitask matter that requires thorough planification at all levels, starting from the rigorous ministry preparation to a detailed guidance towards the school units. Teachers are expected to be well informed and experienced in e-learning, since there is always the obvious risk of creating extra problems, instead of helping students (Vrasidas, Zempylas, & Petrou, 2005). However, while many efforts were made to make distance learning a part of everyday life, teachers, students and parents expressed doubts and raised concerns about the possible marginalization of the teacher's pivotal role, as well as the child's compulsory social isolation.

This research project showed clearly that students were not satisfied with the first implementation of distance learning. A very important factor to the above fact was the teacher's lack of experience and knowledge (Kampourakis & Loukis, 2006) especially on:

- how to create a well-structured online course,
- how to manage e-learning platforms properly,
- how to make the lessons more fun in order to engage students, are issues that have arisen.

Although, students are more familiar with the electronic learning platforms and "skype" program, they did not capable how to deal with the recent requirements. Suddenly, their habits, social role and participation in the school were minimized or lost. In addition, issues of lack of electronic infrastructure (computers and internet) for the realization of their courses were raised. Thus, Greek students having grown up with classical educational methods and they have not seriously taken distance learning so far.

On the other side, the Ministry of Education, despite their enormous efforts, was found quite unprepared to facing properly these new comer circumstances. As an obvious result was that most teachers were not trained in e-learning courses.

Some practical-resolving proposals to the Educational Ministry, teachers and students, in order to sufficiently battle against dysfunctions would be:

- 1) Financial support to students who can not afford to buy computers, laptops, tablets or to offer them free computers.
- 2) Organise information seminars I.C.T (Information and Communication Technology) providing incentives for teachers to participate in these programs.
- 3) Teachers are also advised to abandon the stereotypes in which they are accustomed, to acquire new skills and to begin adapting distance learning.
- 4) Students who do not possess P.C. could borrow it from their schools for the duration of the pandemic.

Additionally, since, the majority of laboratory courses are still not taught, we propose the creation of e-learning courses, using interactive videos, containing questions of various kinds with detailed steps of each exercise.

Furthermore, possessing a reliable internet system is of the utmost importance, in any distant learning procedure.

Finally, living in the era of advanced technical intelligence, there have been tremendous changes in lifestyle (Bates, 2005), creating new habits and cultures. In this regard, distance learning could and should co-exist (Hrastinski, 2008) in the near future and supporting conventional teaching, in the coming years.

## Ethics

Research project was approved by The Committee for Ethics of the University of West Attica. The students were informed over the entire purpose of the project and agreed to participate. It was clarified that their participation in the research was voluntary and anonymous, so they could answer honestly and without fear. The research process complies with the provisions of the Declaration of Helsinki on Human Research.

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## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

## References

- Alfavita. (2020). *Opening Schools: What Is Happening in Other European Countries?*  
[https://www.alfavita.gr/kosmos/329776\\_anoigma-sholeion-ti-ishyei-se-alles-hores-tis-e](https://www.alfavita.gr/kosmos/329776_anoigma-sholeion-ti-ishyei-se-alles-hores-tis-e)

- [yropis/](#)
- Anouti, M., & El Rouadi, N. (2020). The Online Learning Experiment in the Intermediate and Secondary Schools in Lebanon during the Coronavirus (COVID-19) Crisis. *International Journal of Advanced Research in Engineering & Technology*, 7, 14466-14485. [https://www.researchgate.net/profile/Mohammad-Anouti/publication/343444423\\_The\\_Online\\_learning\\_Experiment\\_in\\_the\\_Intermediate\\_and\\_Secondary\\_Schools\\_in\\_Lebanon\\_during\\_the\\_CoronavirusCOVID-19\\_Crisis/links/5f2a877692851cd302dc62c1/The-Online-learning-Experiment-in-the-Intermediate-and-Secondary-Schools-in-Lebanon-during-the-CoronavirusCOVID-19-Crisis.pdf](https://www.researchgate.net/profile/Mohammad-Anouti/publication/343444423_The_Online_learning_Experiment_in_the_Intermediate_and_Secondary_Schools_in_Lebanon_during_the_CoronavirusCOVID-19_Crisis/links/5f2a877692851cd302dc62c1/The-Online-learning-Experiment-in-the-Intermediate-and-Secondary-Schools-in-Lebanon-during-the-CoronavirusCOVID-19-Crisis.pdf)
- Barr, S. (2020). *How Will Schools Change in England as Students Return for Autumn Term?* <https://www.independent.co.uk/life-style/schools-reopen-england-coronavirus-autumn-term-start-masks-a9698421.html>
- Bates, A. W. (2005). *Technology, E-Learning and Distance Education*. New York, NY: Routledge. <https://doi.org/10.4324/9780203463772>
- Bretan, J. (2020). *Poland Planning to Reopen Schools in September If Epidemic Does Not Worsen*. <https://notesfrompoland.com/2020/06/25/poland-planning-to-reopen-schools-in-september-if-epidemic-does-not-worsen/>
- Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The Psychological Impact of the COVID-19 Epidemic on College Students in China. *Psychiatry Research*, 287, Article ID: 112934. <https://doi.org/10.1016/j.psychres.2020.112934> <https://www.sciencedirect.com/science/article/abs/pii/S0165178120305400>
- Cohen, L., Manion, L., & Morrison, K. (2017). *Research Methods in Education*. New York, NY: Routledge. <https://doi.org/10.4324/9781315456539>
- Daniel, S. J. (2020). Education and the COVID-19 Pandemic. *PROSPECTS*, 49, 91-96. <https://doi.org/10.1007/s11125-020-09464-3> <https://link.springer.com/article/10.1007/s11125-020-09464-3/>
- Dhawan, S. (2020). Online Learning: A Panacea in the Time of COVID-19 Crisis. *Journal of Educational Technology Systems*, 49, 5-22. <https://journals.sagepub.com/doi/full/10.1177/0047239520934018/> <https://doi.org/10.1177/0047239520934018>
- E.C.D.C. (European Centre for Disease Prevention and Control) (2021). *COVID-19 in Children and the Role of School Settings in Transmission—First Update*. [https://www.ecdc.europa.eu/sites/default/files/documents/COVID-19-in-children-and-the-role-of-school-settings-in-transmission-first-update\\_1.pdf](https://www.ecdc.europa.eu/sites/default/files/documents/COVID-19-in-children-and-the-role-of-school-settings-in-transmission-first-update_1.pdf)
- Farmakis, N. (2015). *Sampling and Applications*. Athens: Kallipos publications.
- Godin, M. (2020). *Children across Europe Are Going Back to School. Here's How 3 Countries Are Managing It*. <https://time.com/5885554/europe-schools-reopening-germany-scotland-norway/>
- Hrastinski, S. (2008). Asynchronous & Synchronous E-Learning. *Educate Quarterly*, 31, 51-55.
- Isari, F., & Pourkos, M. (2015). *Qualitative Research Methodologies*. Athens: Kallipos Publications.
- Kampourakis, G., & Loukis, E. (2006). *E-Learning*. Athens: Kleidarithmos.
- Kathimerini. (2020). *First Bell on September 14—The Measures*. <https://www.kathimerini.gr/society/1094164/proto-koydoyni-stis-14-septemvrioy-oi-ovlepseis-kai-ta-metra/>

- Komis, V. (2004). *Introduction to the Educational Applications of Information and Communication Technologies*. Athens: New Technologies Publications.
- Kritikou, D. (2015). *Asynchronous Distance Learning—Systems Overview*. <http://apothetirio.teiep.gr/xmlui/handle/123456789/5410/>
- Lionarakis, A. (2001). *Open and Distance Education: Thoughts on a Quality Design Approach of Teaching Material*. <http://newtutor.pbworks.com/f/qualityDesignOfTeachingMaterial.pdf/>
- Markos, A. (2012). *Psychometric Scale Reliability and Validity Analysis Guide with SPSS*.
- Mavrogiorgos, G. (2001). *From the Conventional Education System to the Open and Distance Education of the Hellenic Open University: A Challenge*.
- McAuley, (2020). *Students in France Return to Schools, Even as COVID-19 Cases Soar*. [https://www.washingtonpost.com/world/europe/covid-schools-reopen-france/2020/08/31/21afb94-e93e-11ea-bf44-0d31c85838a5\\_story.html](https://www.washingtonpost.com/world/europe/covid-schools-reopen-france/2020/08/31/21afb94-e93e-11ea-bf44-0d31c85838a5_story.html)
- Ministry of Education (2020). *September 14, 2020 Schools Open*. <http://www.odigostoupoliti.eu/stis-14-septemvriou-2020-anoigoun-ta-scholeia-me-ypo-chreotiki-chrisi-maskas/>
- Morris, S. (2020). *As COVID-19 Cases Soar in Spain, New School Year Comes Too Soon for Some*. <https://www.france24.com/en/20200907-as-COVID-19-cases-soar-in-spain-new-school-year-comes-too-soon-for-some>
- N.P.H.O. of Greece (National Public Health Organization of Greece) (2020). COVID-19 Surveillance Report on 2020/06/30. [https://eody.gov.gr/0630\\_briefing\\_covid19/](https://eody.gov.gr/0630_briefing_covid19/)
- Naftemporiki (2020). *COVID-19: Students from European Countries Return to Schools*. <https://www.naftemporiki.gr/story/1632616/COVID-19-epistrefoun-sta-sxoleia-mathites-europaikon-xoron>
- Official Gazette (B'1739/06-05-2020). *How to Reopen School Units after the End of Their Temporary Ban*.
- Official Gazette (B'783/10-03-20). *Implementation Measure of the Temporary Ban on the Operation of School Units for the Period from 11.3.2020 to 24.3.2020*.
- Official Gazette (B'2026/27-05-20). *How to Reopen Primary Education Schools and Special Education Schools after the End of Their Temporary Ban*.
- Orlandi, G. (2020). *COVID-19: Four Further Italian Regions Reopen Their Secondary Schools*. <https://www.euronews.com/2021/01/25/COVID-19-four-further-italian-regions-reopen-their-secondary-schools>
- Papanastasiou, K. (2021). *Methodology of Educational Research*. Athens: Kallipos Publications.
- Siomkos, I., & Vasilakopoulou, A. (2005). *Application of Analytical Methods in Market Research*. Athens: Stamoulis Publications.
- Sofos, Kostas, & Paraschou. (2015). *Online Distance Learning*. Athens: Kallipos Publications.
- Vrasidas, Ch., Zempylas, M., & Petrou, A. (2005). *Modern Pedagogical Models and the Role of Educational Technology. Advanced Internet Technologies in the Learning Service*. Athens: Kastaniotis Publications.