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The Impact of COVID – 19 First Outbreak on Greek Private High Schools & The Distance Learning Experience

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Abstract

Although when we speak of COVID – 19 the main affect concerns the health of individuals, it is clear that the pandemic has also affected many aspects of life such as the educational sector. Both teachers and students in Greece faced the challenge of the implementation of distance learning, national wide, during the pandemic.

There is still a lack of a proper theoretical model and comprehensive scientific tools to measure the impact of COVID – 19 in education. The purpose of this research is to study and analyze whether distance learning affected the Greek private high schools in different ways such as in terms of students' graduation or their success rate in the PanHellenic Exams, during the first outbreak of the COVID-19 pandemic.

Based on literature and feedback received from high schools' principals we captured important results over the use of distance learning and its effectiveness. More specifically, through the quantitative study performed on 63 out of 79 private high schools' principals, the researchers reached the conclusion that the majority of private schools managed distance education successfully. It was proved that both teaching and administrative staff were highly competent and skilled in the use of new technologies and therefore, distance education was not treated as a problematic situation but it steadily became part of each school's daily routine.

EL Classifications: **M19 (**M: Business Administration and Business Economics/ Marketing/ Accounting/ Personnel Economics – M1: Business Administration – M19: Others)

Key words: Distance Education, COVID – 19 Pandemic, Greek Private High Schools, Principals

1 Introduction

Schools are an important part of the infrastructure of communities and the way teaching is delivered represents a top priority for all communities. SARS-CoV-2 appeared first in Greece on 26 February 2020 and our country followed the common practice of distance learning in School Education as instructed by the E.U. during the long-lasting pandemic.

The pandemic of COVID-19 has accelerated the spread of distance learning at all stages of education and it shifted the conventional, face-to-face instruction to distance teaching and learning. This automatically meant that teaching approaches, tools of assessments, and ways of teacher-student communication had to be modified.

Two years after the pandemic started we experience an era where students can learn anytime and anywhere, thus evolving new skills in the process that leads to long-life learning (Nuraini, N.L.S., Qihua, S., Venatius, A.S., Slamet, T.I., Cholifah, P.S., 2020).

Literature Review shows a wide coverage of the concept of "distance learning" before, during, and after COVID-19. Research highlights certain problems were revealed such as the weakness of online teaching infrastructure, the limited exposure of teachers to online teaching, the information gap, a non-conducive environment for learning at home, equity and academic excellence in terms of higher education (Pokhrel, S., Chhetri, R., 2021).

The results which were received for the period during the pandemic show also a gap in the readiness of teachers and students for distance learning. There is noted a lack of comprehensive research on the difficulties and challenges experienced by high school teachers which motivated us to carry out this research.

This study aims to explore all challenges experienced by Greek High schools in the process of mass transition to distance learning due to the COVID-19 pandemic outbreak. The data collected via survey properly analyzed and interpreted aims to contribute to advancing the e-learning knowledge and methodology.

2 Literature Review

2.1 COVID – 19 Impacts on School Education

Learning is associated with better life outcomes, health, and well-being (OECD, 2021a, 2021b). It also helps children build resilience to recover from crises (OECD, 2021b). More than 1.5 billion students and youth across the planet are or have been affected by school and university closures due to the COVID-19 pandemic (https://en.unesco.org/covid19/educationresponse).

As schools have been closed to cope with the global pandemic, students, parents, and educators around the globe have felt the unexpected effect of the COVID-19 pandemic. While countries were doing their best to cope with the outbreak, education systems were trying to continue offering quality education during these difficult times. A disruption in schooling has short, medium, and long-term risks for the development, well-being, protection, and future prospects of children, and lasting consequences for social and economic recovery, people's resilience, and sustainable development (Fenner, R., Cernev, T., 2021).

Governments and education systems turn to research in order to assess the impact of the pandemic on education. A body of important literature is emerging in the last period that can help mitigate the impact of the pandemic on education. Surveys carried out by researchers try to capture the cost of the pandemic and some use the term of "unfinished learning" to capture the reality that students were not given the opportunity to complete all the learning they would have completed in a typical year (Whitley, J., Beauchamp, M., Brown, C., 2021). Others bring to light the impact of the COVID-19 pandemic on teaching and learning, not only in terms of challenges but also opportunities for schools, teachers, and students. (Meinck, S., Fraillon, J., Strietholt, R., 2022).

The research focused on the examination of systems' and schools' preparedness for implementing remote teaching and learning prior to, during, and after the school closures. A broad range of topics related to infrastructure, resources, human support mechanisms, and capacities related to remote teaching and learning is important. The basic assumption is that the exceptional situation made by the pandemic forced teachers, parents, and students to quickly adapt to a new educational context which brought to light distance learning. Teachers had to develop online academic materials that could be used at home to ensure educational continuity while ensuring the necessary physical distancing. Primary and secondary school students suddenly had to work with various kinds of support, which were usually provided online by their teachers. The motivation and engagement of students, teachers, and school leaders to implement teaching and learning during covid era through distance learning is to be reviewed and discussed.

2.2 Distance Learning in School Education

Distance learning is a mode of teaching and learning that was already available before the pandemic. Actually, the concept of distance learning first appeared in 1840, and within a few years, distance education programs become available in the UK, Germany, USA, and Japan. (Debes, G., 2021). The subject of distant learning has been studied extensively in the fields of

pedagogics and psychology for quite some time (Palatovska, O., Bondar, M., Syniavska, O., Muntian, O., 2021).

E-learning tools have played a crucial role during this pandemic, helping schools and universities facilitate student learning during the closure of universities and schools (Subedi, S., Nayagu, S., Subedi, S., Shah, S.K., Shah, J.M., 2020). Audio podcasts, films, numerous simulators, and online quizzes are just a few of the technological tools available for distance learning. Some of the online platforms used include unified communication and collaboration platforms such as Microsoft Teams, Google Classroom, Canvas, and Blackboard, which allow teachers to create educational courses, training, and skill development programs (Petrie, C., Aladin, K., Ranjan, P., Javangwe, R., Gilliand, D., Tuominen, S., Lasse, L., 2020). The overall goal of distance learning for educators is to build their capacity in three types of knowledge (technological, pedagogical, and technological pedagogical) and in designing and developing technology-enhanced, effective instruction (Anderson, A., 2004; Alanso, F., Lopez, G., Manrique, D., Vines, J. 2005).

On this matter, many theories have been reported investigating the most effective ways to create online learning platforms (Cook, D.A., Dupras, D.M., 2004). Distance learning has provided a lifelong learning phenomenon for significant growth in learners' capacity-building needs (O'Neill, K., Singh, G., O' Donoghue, K., 2004). However, the best practices for online homeschooling are yet to be explored (Petrie, C., Aladin, K., Ranjan, P., Javangwe, R., Gilliand, D., Tuominen, S., Lasse, L., 2020). A literature review has shown recent international research and experiments on the effect of COVID-19 on education such as:

- The psychological impact of the COVID-19 epidemic on college students in China (Cao, W., et al., 2020).
- Online learning: A panacea in the time of COVID-19 crisis (Dhawan, S., 2020).
- Assessment of Greek high school students towards distance learning, during the first wave of the COVID-19 pandemic (Vlassopoulos, G., Karikas, G., Papageorgiou, E., Psaromiligos, G., Giannouli, N., Karkalousos, P., 2021).

Recent evaluations of distance learning have been an emphasis on the advantages and disadvantages of distance learning. Researchers still need time to determine whether distance learning is better than conventional learning. The literature offers contradictory findings on the impact of online teaching and the overwhelming challenges created by the pandemic. However, a number of other studies (Di Pietro, G., Biagi, F., Costa, P., Karpinski, Z., Mazza, J., 2020; Mascheroni, G., et al., 2021; Petrie, C., Aladin, K., Ranjan, P., Javangwe, R., Gilliand, D.,

Tuominen, S., Lasse, L., 2020), claimed that children experienced positive effects due to the shift to online teaching.

A study by Busuttil L. & Farrugia R.C. (2020) indicated that the shift to online teaching brought new benefits for teachers. Taken together, this evidence suggests that online teaching and learning can only be effective if students and teachers have consistent and constant access to the internet and digital equipment (García, E., Weiss, E., 2020).

Grynyuk, S. et al. (2022) proposed to create "the most favorable conditions for students and teachers during the learning process and their full adaptation to training conditions"; to provide an "individually-differentiated approach to teaching"; create "a well-thought-out system of professional development and retrain teachers" (with organizational and methodological assistance; distant and networked forms of organization; mentoring, exchange of good practices and experience).

Studies to improve our understanding of the impact of the COVID-19 pandemic on educational learning can help guide needed changes and achieve students learning and development. Therefore, the aim of the paper is to bring together the evidence for the impact of the COVID-19 pandemic on distance learning as it was experienced by 64 High School Principals. Consequently, it addresses the following questions:

- What was the impact of COVID-19 on high school students learning?
- How can these findings inform and provide recommendations for better learning during current and future pandemics?

3 Sample & Methodology

3.1 Purpose of the Research

The purpose of this research is to study and analyze statistically whether the different ways of teaching in the Greek private high schools affected both the graduation rate and the percentage of success for students in the Panhellenic Exams, during the first outbreak of the COVID-19 pandemic. More specific, private high schools' principals were asked three main questions:

1) How much did COVID-19 affect the everyday life of your school?
2) What is the graduation rate from your school?

This index examines the number of students who have completed their school education and received their high school diploma within the normal time frame.

3) What is the percentage of successful candidates in the Panhellenic Exams?

This index examines the number of students who have completed their school education and entered domestic universities through Panhellenic Exams within the normal time frame.

3.2 Study Sample

As population is called "the wider group of subjects" (Athanasiou, L., 2007), i.e. the people who take part in the research. According to the latest data from the Ministry of Education, the active private general high schools of Greece - the size of the population, i.e. "the total number of subjects" (Athanasiou, L., 2007) - is 79 and their principals are the subjects of the research, i.e. "the people who take part in the research" (Athanasiou, L., 2007). Therefore, the data is primary, their source is the human factor and they have one or more of the following forms: "what they say", "what they do", and "what they have" within the unit they manage (Newby, P., 2019). After the preparation and evaluation of the questionnaire, it is distributed via e-mail to all Greek private high schools, but an informative phone call was made to them previously. This method of collecting research material increases the chances of responses from the population, especially those in different geographical areas, in order to ensure, as much as possible, representativeness. Also, the subjects had the comfort of time to answer, they ensured - to a certain extent - their anonymity, and they were not influenced during the answer.

The questionnaires that were returned, were systematically monitored and also, the e-mail addresses, the dispatch's date, and the return's date are carefully noted. Each questionnaire was accompanied by a brief letter stating the aims and necessity - the reason for conducting the research, the contribution of the subjects, and the contribution in the field of organization and administration of the educational units. Twenty calendar days after the first sent, a second sent was followed as a reminder. The data collection period was from 20.11.2020 to 20.01.2021. The total number of answers was 63 of the 79 operating private general high schools in Greece. The response rate, also known as the completion rate or return rate, is as follows:

$$RR1 = \frac{I}{(I+P)+(R+NC+O)+(UH+UO)} = \frac{63}{(63+0)+(16+0+0)+(0+0)}$$
$$= \frac{63}{79} \cong 0.794 \text{ ή } 79.4\%$$

where:

RR1 = the minimum response rate, I = the number of completed questionnaires, P = the number of partially completed questionnaires, R = the number of people who refused to complete the

questionnaire, NC = the number of respondents who could not be identified, O = other, UH = the number of schools for which there is no information to locate them (in this case, e-mail accounts that are not active), UO = the number of units not known for some other reason.

In general, the (expected) response rate for surveys conducted via e-mail is 20-30% but when other methods follow, e.g. telephone call, can reach 70% (Fincham, J.E., 2008). However, because in this study the population was small and all principals had the opportunity to answer the questionnaire (non-sampling), it was deemed necessary to seek a high response rate for reasons of reliability, impartiality, and generalization of results (Draugalis, J. Plaza, M.C., 2009), as achieved.

3.3 Questionnaire design

Given that the research was done with a quantitative approach and methodology, the questionnaire was used as a tool-measuring instrument, which is a basic mean of collecting research data. Its construction is related to two aspects: (a) the shaping of the content and (b) the shaping of its appearance, in order to form an - as much as possible - accurate image both in width and depth. In this case, in order to investigate the views of the participants, it was considered appropriate to select a part of a pre - made questionnaire which was concerned exclusively school principals. After translation and some modifications to some questions in order to fully reflect the Greek data and to be directly related to the research questions, the aims, and the objectives of research, the final questionnaire was prepared. The questionnaire was based on an existing tool of OECD used in the Teaching & Learning International Survey (TALIS).

3.4 Validity & Reliability Checks

As there is no theory of the poll from which to derive all the details of creating a questionnaire, each of them must be examined empirically with a test in order to ensure a sufficient variety of answers, degree of understanding, difficulty, and quality of questions, ensuring interest in the questions throughout the flow of the questionnaire and the duration of the research (Schnell, R., Hill, P.B., Esser, E., 2014; Athanasiou, L. 2007). These were assisted by validity and reliability checks, which gave satisfactory results and no significant modifications were required. After all, the quality of the results of a survey depends to a large extent on the measuring instrument, which was used to elicit the perception of the participants (Sekaran, U., 2003). To determine the quality of the questionnaires, both reliability and validity checks were performed. Reliability refers to the extent to which a measurement process gives similar

results to repeated measurements which are performed with the same tool, the same subjects under the same conditions (Dimitriadi, Z., 2000). The internal consistency of the questionnaire variables was checked with the Cronbach a reliability coefficient which shows the reliability coefficient of each variable and all at the same time (Cronbach, L.J., 1951). An instrument is considered reliable when the Cronbach a coefficient is between 0 and 1. 0 is interpreted as a lack of reliability and 1 as a highly reliable scale (Nunnally, J.C., 1978). Thus, in this case the Cronbach a reliability index of the Likert scale is calculated considering 7 questions together with their sub-questions. The value of the reliability index is equal to 0.625. This value is close to 0.7 (Table 1) and this indicates that the scale is sufficiently reliable. Validity refers to the degree to which a tool measures what the researcher really wants to measure (Sekaran, U., 2003).

TABLE 1

3.4: Validity & Reliability Check

Cronbach's Alpha	N of items
.0625	40

3.5 Statistical Data Analysis

Both the coding and the analysis of the research material, which is collected through the questionnaires, is one of the most basic phases of the research. The material is systematically coded - all responses are converted into data suitable for the processing of the material - and measured quantitatively and qualitatively so that its utilization follows. In this research, the data analysis was done with the help of the statistical package SPSS Statistics where all the answers were entered in a file and the relevant checks were performed in order to detect and eliminate any coding errors or recalculations. More specifically, a descriptive statistical analysis was performed to display the demographic and other selected characteristics of the respondents.

Furthermore, chi-square was applied to investigate the most important correlations between the variables after the necessary normality tests have been completed as shown below.

4 Results

4.1 Demographic Characteristics Analysis

4.1.1 Principals

Sex: The research involves 63 principals, of which 44 are men and 19 are women.

Higher level of education: Of the 63 participants, 31 hold a university degree/ technological educational institution or equivalent, 22 hold a master's degree and 10 hold a doctorate.

Specialty: The participants are of various specialties but most of them are Philologists (33.3%) and a great number of principals are specialized in Natural Sciences (19%).

Age: Of the 63 participants, 11.1% are under 40 years old, 15.9% belong to the age group 40-49 years and 17.5% are older than 60 years. However, the majority (55.6%) of the principals belong to the age group of 50-59 years.

Years of work as a principal at this school: Most (38.1%) participants have 5 - 10 years of work as principals in the school where they are "today", 27% are less than 5 years old, 20.6% are 11-20 years and only 9 principals have more than 20 years of work in the same school as the current one.

Years of work as a school principal in general: Most (36.5%) participants have 5 - 10 years of work as school principals in general, while 30.2% have less than 5 years, 19% have 11 - 20 years and only 9 principals have more than 20 years of work in school in general.

Years of work in other administrative positions (not as a principal): Most (36.5%) participants have less than 5 years of work in other management positions (not as principals), while 23.8% have 5 - 10 years, 19.0% have 11 - 20 years and 13 participants have more than 20 years of work in various administrative positions within the educational units.

Current status as a principal based on working hours: Of the 63 participants, the vast majority (74.6%) work full-time (more than 90% of the hours) with teaching obligations.

4.1.2 Schools

Years of the high school: Most schools (41.3%) have been operating for 10 - 39 years, 28.6% operate for 40-69 years, 22.2% operate for more than 70 years and only 5 schools operate for less than 10 years.

Average amount of annual tuition (per student): Of the total number of participants in the survey, 44.4% have an average annual tuition fee (per student) € 5,000 - € 6,999, while 41.3% have € 3,000 - € 4,999, 12.7% have more than € 7,000 and only 1 school has annual tuition less than € 3,000.

Source of financial resources: Regarding the source of the school's financial resources, it appears that in vast majority (88.9%), they come from the tuition fees paid by parents or

guardians. The other 7 schools operate with resources that come from donations, bequests, sponsorships, scholarships, fundraising from parents or guardians.

Administration: All the schools are managed and operates privately entirely.

Graduation rate: During the school year 2019 - 2020, the vast majority (87.3%) of schools have a graduation rate of over 91%, while in 7 schools it is estimated that this percentage is between 61 - 90% and in 1 school is considered to be less than 30%.

Percentage of successful candidates in the Panhellenic Exams: During the school year 2019 - 2020, in the majority (68.3%) of schools, the principals state that they have a percentage of successful in the Panhellenic Exams over 91%, while in 20 schools it is estimated that this percentage is between 61 - 90 % and in no school is less than 30%.

4.1.3 Student Audience

Number of students in the first class of high school: During the school year 2019 - 2020, most (38.1%) of the schools have less than 50 students in their first class, while 31.7% of them have 51 - 100 students, 23.8% of them have 101 - 150 students and only 4 schools have more than 151 students.

Number of students in the second class of high school: During the school year 2019 - 2020, most (38.1%) of the schools have 51 - 100 students in their second class, while 36.5% of them have less than 50 students, 19.0% of them have 101 - 150 students and only 4 schools have more than 151 students.

Number of students in the third class of high school: During the school year 2019 - 2020, most (41.3%) of the schools have less than 50 students in their third class and also, the exact same percentage has 51 - 100 students, while 14.3% of schools has 101 - 150 students and only 2 schools have more than 151 students.

Number of departments in the first class of high school: During the school year 2019 - 2020, out of the total number of participants in the Lyceum research, in the majority (52.4%), the number of departments in the A 'Lyceum ranges between 3-5, several (39.7%) schools have less than 2 departments and 5 Lyceums have more than 6 departments (Table 5.23.).

Number of departments in the second class of high school: During the school year 2019 - 2020, in the majority (46%) of schools, the number of departments in the second class ranges

between 3 – 5. Several (44.4%) schools have less than 2 departments and 6 schools have more than 6 departments.

Number of departments in the third class of high school: During the school year 2019 - 2020, the majority (49.2%) of schools, the number of departments in the third class ranges between 3 – 5. Several (42.9%) schools have less than 2 departments and 5 schools have more than 6 departments.

4.1.4 Teaching & Administrative Staff

Number of teachers: During the school year 2019 - 2020, most (34.9%) of the total number of schools in the survey have 21 - 30 teachers, while 33.3% of schools have 11 - 20 teachers, 30.2% of schools have more than 31 teachers and only 1 school has less than 10 teachers.

Previous teachers' experience in years (average): During the school year 2019 - 2020, the majority (54%) of schools have teachers who have 11 - 19 years of experience (on average), while 33.3% of schools have teachers who have 6 - 10 years of experience (on average), 9.5% of them have teachers who have more than 20 years of experience (on average) and only in 2 schools the teachers have less than 5 years of experience (on average).

Higher level of teacher's education (average): During the school year 2019 - 2020, the majority (63.5%) of schools have teachers who hold a master's degree, while 34.9% of schools have teachers who hold a university degree/ technological educational institution or equivalent (on average), and only in 1 school the teachers have a doctorate (on average).

Employment of other staff: During the school year 2019 - 2020, in the majority (57.1%) of schools (a) school counselors - psychologists, (b) school traffic wardens, caretakers, security guards and (c) experts for administrative and secretarial support are employed, while 14.3% of the schools both school counselors - psychologists and experts for administrative and secretarial support are employed. Finally, only employees for administrative and secretarial support work in 11 schools.

4.2 Correlation of variables

In order to make and interpret the correlation between different examined variables, which are purposefully selected, in order to achieve the objectives of the paper, it is necessary to perform independence test x^2, homoscedasticity test, normality test and ANOVA tests based on the following assumptions:

1. Independence test x^2

H0 = The two variables are independent.

H1 = The two variables are not independent.

2. Homoscedasticity test

H0 = The two variables have a constant variance.

H1 = The two variables do not have a constant variance.

3. Normality test

H0 = The variable follows a normal distribution.

H1 = The variable does not follow a normal distribution.

4. ANOVA test

H0 = The variances in all groups are equal.

H1 = The variances in all groups are different.

Influence of COVID-19 pandemic on school's everyday life: The graduation rate & The Percentage of successful candidates in the Panhellenic Exams

An independence test is performed between the two questions. Next, it is examined whether the normality assumptions are examined to see if parametric or non-parametric tests should be performed.

1. Independence test x^2

From the next table (Table 2), it appears that in the independence test x^2, the p-value is equal to 0.208 which is greater than 0.05, so at a level of statistical significance of 5% the null hypothesis is not rejected. This means that the variables are independent. Thus, it is 0.e. the issue of the virus is independent of the graduation rate during this school year.

TABLE 2

4.2: Chi – Square Tests

	Value	**df**	**Asymptotic Significance (2 – sided)**
Pearson Chi – Square	10.890 [a]	8	.208
Likelihood Ratio	11.096	8	.196
N of Valid Cases	63		
a. 12 cells (80.0%) have expected count less than 5. The minimum expected count is .06.			

From the next table (Table 3), it appears that in the independence test x^2, the p-value is equal to 0.428 which is greater than 0.05, so at a level of statistical significance of 5% the null hypothesis is not rejected. This means that the variables are independent. Thus, it is concluded that COVID-19 did not affect the everyday life of each school, i.e. the issue of the virus is independent of the percentage of successful candidates in the Panhellenic Exams during this school year.

TABLE 3

4.2: Chi – Square Tests

	Value	**df**	**Asymptotic Significance (2 – sided)**
Pearson Chi – Square	3.844 [a]	4	.428
Likelihood Ratio	3.555	4	.470
N of Valid Cases	63		
a. 12 cells (80.0%) have expected count less than 5. The minimum expected count is 1.27			

2. Homoscedasticity test

Considering as variable A → the percentage of graduation from school during the school year 2019 - 2020 and as variable B - Factor → the influence of COVID-19 on the school's operation, from the above table, during the homoscedasticity test, it is observed that the p-value is equal to 0.055 which is greater than 0.05. From this it is concluded that at a level of statistical

significance of 5% the null hypothesis is not rejected and the 2 variables have a constant variance (Table 4)

TABLE 4

4.2: Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
3.843	1	60	.055

Considering as variable A → the percentage of successful students in the Panhellenic Exams from the school during the school year 2019 - 2020 and as variable B – Factor → the influence of COVID-19 on the school's operation, from the above table, during the homoscedasticity test, it is observed that the p-value is equal to 0.965 which is greater than 0.05. From this it is concluded that at a level of statistical significance of 5% the null hypothesis is not rejected and the 2 variables have a constant variance (Table 5).

TABLE 5

4.2: Test of Homogeneity of Variances

Levene Statistic	df1	df2	Sig.
.002	1	61	.965

3. Normality Test

Considering as variable A → the influence of COVID-19 on the school's operation and as variable B - Factor →the percentage of graduation from school during the school year 2019 - 2020, from the next table, during the normality test Kolmogorov – Smirnov, it is observed that all p-values are less than 0.05, so at a level of statistical significance of 5% the null hypothesis is rejected (Table 6). This implies that the resulting variable does not follow a normal distribution. In the Shapiro - Wilk normality test it is observed that the p-value is less than 0.05 so at a level of statistical significance of 5% the null hypothesis is rejected. This implies that the resulting variable does not follow a normal distribution. Due to the fact that the condition of normality is not met everywhere, a non-parametric test will be performed. The choice of the non-parametric test Kruskal - Wallis is made because the x^2 independence test is valid. The test is performed between a categorical variable with 5 categories and another categorical variable with 3 categories.

TABLE 6

4.2: Test of Normality

	Kolmogorov – Smirnov[a]			Shapiro - Wilk		
	Statistic	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
61% - 90%	.362	7	.006	.794	7	.036
>=91%	.292	55	.000	.794	55	.000
a. Lilliefors Significance Correction						

Considering as variable A → the influence of COVID-19 on the school's operation and as variable B - Factor → the percentage of successful students in the Panhellenic Exams from the school during the school year 2019 - 2020, from the next table, during the normality test Kolmogorov - Smirnov it is observed that the p-value is less than 0.05, so at a level of statistical significance of 5% the null hypothesis is rejected (Table 7). This implies that the resulting variable does not follow a normal distribution. In the Shapiro - Wilk normality test it is observed that all p-values are less than 0.05 so at a level of statistical significance of 5% the null hypothesis is rejected. This implies that the resulting variable does not follow a normal distribution. Due to the fact that the condition of regularity is not met everywhere, a non-parametric check will be performed. The non-parametric test Man - Whitney U control is selected because the test is between a categorical variable with 5 categories and another categorical variable with 2 categories.

TABLE 7

4.2: Test of Normality

	Kolmogorov – Smirnov[a]			Shapiro - Wilk		
	Statistic	**df**	**Sig.**	**Statistic**	**df**	**Sig.**
61% - 90%	.286	20	.000	.835	20	.003
>=91%	.313	43	.000	.784	43	.000
a. Lilliefors Significance Correction						

4. ANOVA test

Non-parametric control Kruskal – Wallis: Considering as variable A → the influence of COVID-19 on the school's operation and as variable B - Factor → the percentage of graduation from school during the school year 2019 - 2020, from the next table, during the non-parametric test Kruskal - Wallis, it is observed that the p-value is equal to 0.765 which is greater than 0.05 so at a level of statistical significance of 5% the null hypothesis is not rejected (Table 8). This means that the groups that have been created based on the graduation rate during the examined school year do not differ from each other in terms of the influence of COVID-19 on the daily operation of the school. Therefore, the school graduation rate was not affected by COVID-19 pandemic.

TABLE 8

4.2: Test Statistics

	The influence of COVID-19 on the school's operation [a]
Chi – Square	.535
df	2
Asymp. Sig.	.765
a. Kruskal Wallis Test	

Non-parametric Mann-Whitney U control: Considering as variable A → the influence of COVID-19 on the school's operation and as variable B - Factor → the percentage of successful students in the Panhellenic Exams from the school during the school year 2019 - 2020, from the next table, according to the non-parametric Mann-Whitney U test, it is observed that the p-value is equal to 0.614 which is greater than 0.05 so at a level of statistical significance of 5% the null hypothesis is not rejected (Table 9). This means that the teams that have been created based on the percentage of successful candidates in the Panhellenic Exams during the examined school year do not differ from each other in terms of the influence of COVID-19 on the daily operation of the school. Therefore, the percentage of successful candidates in the Panhellenic Exams was not affected by COVID-19 pandemic.

TABLE 9

4.2: Test Statistics

	The influence of COVID-19 on the school's operation
Mann – Whitney U	397.500
Wilcoxon W	607.500
Z	-.505
Asymp. Sig. (2 – tailed)	.614

In conclusion and based on the hypotheses made, neither the percentage of successful candidates in the Panhellenic Exams nor the school graduation rate was affected by COVID-19 pandemic.

6 Conclusions

With the global crisis caused by COVID-19 pandemic and the shutdown of schools, the continuation of learning was ensured only thanks to the digital skills, flexibility, and creativity of teachers who had to find immediately creative solutions with online resources. Online learning has provided the opportunity to teach and learn in innovative ways unlike the teaching and learning experiences in the normal classroom setting (Pokhrel S., Chhetri, R., 2021).

In an effort to mitigate the effects of the pandemic crisis on the education system, Greek private high schools have chosen as an emergency solution the method of digital education with the extensive use of modern information and communication technology systems. There are incomparable opportunities for cooperation, creative solutions and willingness to learn from others and try new tools as educators, parents and students share similar experiences (Doucet, A., Netolicky, D., Timmers, K., Tuscano, F.J., 2020).

After the COVID-19 pandemic when the normal classes resume, teachers and learners should be encouraged to continue using such online tools to enhance teaching and learning (Pokhrel S., Chhetri, R., 2021). Studies on the impact of the COVID-19 pandemic on teaching and

learning in high schools concludes that although various studies have been carried out, in the case of developing countries, suitable pedagogy and platform for different class levels of higher secondary, middle and primary education need to be explored further (Pokhrel S., Chhetri, R., 2021).

The lesson learnt from the COVID-19 pandemic is that teachers and students/ learners should be oriented on use of different online educational tools. After the COVID-19 pandemic when the normal classes begin teachers and learners should be encouraged to continue using such online tools to enhance teaching and learning. Teachers are obliged to develop creative initiatives that assist to overcome the limitations of virtual teaching. There are incomparable opportunities for cooperation, creative solutions and willingness to learn from others and try new tools as educators, parents and students share similar experiences (Doucet, A., Netolicky, D., Timmers, K., Tuscano, F.J., 2020).

Online learning has provided the opportunity to teach and learn in innovative ways however there are several things to be considered in order to improve the overall student experience such as:

- Provision of financial support to students who cannot afford to have a computer an offer them what is needed based on financial criteria. In case it is not possible to grant such equipment students can be granted the possibility to borrow this kind of equipment from their schools during such situations.
- Creation of e-learning courses, using interactive videos, containing questions of various kinds with detailed steps of each exercise.
- Educational seminars for teachers to improve their ability to handle online learning and the general E- learning experience and psychology of students during the process.

Moreover, several recommendations can be considered for future research. For example, tt would be useful to investigate the effectiveness and efficiency of educational institutions as a whole, both during the closure of schools, which was a consequence of the restrictive measures as well as during the re-opening. Furthermore, either the primary schools' everyday life or the higher educational institutions both in the Prefecture of Attica and throughout Greece could be investigated. Future research should include both parents and students to investigate their perception of online teaching and learning so that comparative studies can be done. Finally, future studies should include data from all cycles of education (meaning 1,2nd and 3rd cycle).

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