INTERNATIONAL JOURNAL OF EDUCATION AND INFORMATION TECHNOLOGIES
DOI: 10.46300/9109.2020.14.22 Volume 14, 2020

Pupils' Perceptions and Suggestions for the Improvement of Distance Education in Greece

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Received: January 13, 2021. Revised: February 14, 2021. Accepted: February 19, 2021. Published: February 22, 2021.

Abstract—During the first wave of the COVID-19 pandemic, Greek schools were closed, and for the first time in Greece, distance education has been implemented using mostly technological means. This work aims to capture the Greek pupils' perceptions and suggestions on the transition from a face-to-face educational process to a pure distance synchronous and asynchronous education implementation. Data have been collected by 41 pupils via an online questionnaire on a volunteer basis. The purpose of the questionnaire was to identify the pupils' learning challenges and unforeseen benefits connected to the offered distance education. The assessment revealed that the majority of the pupils, although they consider distance education as necessary and useful, do not want to replace the traditional means of education. The pupils suggested that the entire process should be stricter in terms of class schedule, assignment submission, and presence requirements and should be enhanced by incorporating better and more "vivid" e-teaching tools.

Keywords—Assessment, Distance education, Learning Process, COVID-19 pandemic.

I. Introduction

In today's information era, education is not limited to the four walls of a classroom, where a teacher and a unique recommended book are the only sources of knowledge. Information can be found in a multitude of places, and people have access to it anytime and from anywhere, in a way tailored to their specific needs. This emerging "collaborative" learning environment allows access to a variety of shared learning resources and digital repositories and provides a variety of means of communication between the learners. Moreover, due to the exponentially growing importance of lifelong learning, new and more powerful e-learning environments are being created, aiming on the one hand to manage the knowledge provided and on the other hand to provide appropriate means of easy access to this knowledge. E-learning can be seen as the natural combination of the integration of distance learning and the effective and efficient management of the available knowledge [1], [2].

The COVID-19 pandemic has affected many areas of our daily routines. Education is a sector that has been considerably affected by the pandemic - second only to the health industry [3], [4]. In March 2020, the number of students whose educational program was affected was around 300 million and increased to 1.6 billion in April 2020 [5]. Educational administrations all over the world were forced to proceed immediately to considerable adjustments in the education delivery methods in order to respond to this pandemic. As expected, in their efforts to provided distance education services, they faced various challenges, such as which platforms and tools to use, how to address the specific needs of the various education levels (i.e., primary, secondary, or higher), as well as what would be the expected educational outcomes for each individual student [6].

At these unprecedented circumstances, the students needed the proper guidance to acclimate themselves not only to the tools used in the remote instruction but to the instructor's expectations regarding the learning outcomes of this new educational process as well. Moreover, this unplanned rapid transition from traditional to online learning – in some cases with no training, with insufficient internet bandwidth, and with unjustifiably limited preparation – may result in a poor learning experience that is unconducive to the expected outcomes. Given this situation, it is necessary to understand what students and the other involved parties consider to be the most significant advantages and disadvantages of distance education as it was offered during this period. Identifying the pros and cons of this educational process will give hints both to the development of new procedures and the enhancement of the existing ones in the direction of improving the learning experience [7], [8], as well as of examining the possibility of moving to a new hybrid successful education model [9].

Following the first widespread closure of schools in Spring 2020, the Greek schools were obliged to deliver a pure

distance education for the first time in their history. The educational community faced the challenge of providing relevant guidance in less than two weeks and was asked to quickly design, implement, and sustain a distance learning program while the schools were closed. The Greek teachers grappled with the challenges of remote learning and its implementation and tried to determine what safeguards that pupils are socially in-tune, emotionally intact, and cognitively engaged in an online environment. Meeting the pupils' needs became more difficult as teachers traded the predictability of in-person schooling for the unpredictable nature of learning from a distance.

Even though during the last ten years Greece has put a tremendous effort in the direction of "digitizing" the Greek educational process from a variety of perspectives (such as content, infrastructures and methods) [10], this unexpected situation has brought into light specific weaknesses as distance education has stressed everyone and as well as the available infrastructure to their limits. The forced adoption of online teaching and learning with an uncertain duration horizon emerged various issues that had to be taken into account, considered and evaluated. These issues included instructional delivery systems, diverse learning styles and distance education models, age and cultural variations, and the need for increased technical support [11]. Meanwhile, the lack of adequate and easily-accessible information on best practices and previous experiences to guide teachers and administrators in such a sudden transition, intensified the problem.

Towards this direction, this work aims to capture and assess the students' perceptions, attitudes and satisfaction level of the distance learning procedure that was implemented in the Greek secondary educational process. Since it is important to monitor and understand the effectiveness and the engagement of remote learning from the learner side, this assessment also aims to identify the pupils' learning challenges and unforeseen benefits connected to the distance education delivery. Such an assessment is expected to lead to the creation of new educational practices and the updating of the existing ones.

The rest of this manuscript is organized as follows: In Section II, the ways of implementation of distance education, along with the associated advantages and disadvantages are listed. The digital educational content and the relevant e-services and systems that were used for the implementation of distance education in Greek primary and secondary schools during the period of the assessment are analyzed in Section III. Section IV presents the research methodology, and section V analyses the data results from an electronic questionnaire. Section VI includes a discussion on the relevant research findings. Finally, concluding remarks, limitations and future actions proposed by the pupils for the improvement of the process in a likely future deployment are reported in Section VII.

II. Review of Distance Education

A. Ways of Implementation

The rapid development of information and communication technologies (ICT) alongside the move towards more knowledge-intensive, interdependent and internationalized societies create new challenges and opportunities for the design and delivery of education [12], [13]. This incorporation of technological means and innovative education strategies has transformed the teaching and learning processes [14].

For the learner, open and distance learning means increased access and flexibility, as well as the possible combination of work and education. It may also mean a more learner-centred approach, enrichment, higher quality, and new interaction methods [8]. The distance education model can be implemented with synchronous, asynchronous and blended learning methods [11], [15]:

- Synchronous learning is the online or distance education that takes place in real-time, often with a set class schedule and required login times. Standard methods include video conferencing, teleconferencing, live chatting, and live-streamed lectures in real-time via a platform using a personal computer, a tablet or a smartphone. The produced content can be recorded or stored in a digital form and accessed later if necessary.
- Asynchronous learning occurs on the learner's individual schedule. Within the asynchronous learning process, an instructor, or just a program, may provide to the learner materials for reading, lectures for viewing, assignments for completing, and exams for evaluation. The learner can access and satisfy these requirements on his own schedule, as long as he meets the expected deadlines.
- Blended learning, also referred to as hybrid learning, combines face-to-face learning with online learning and offers the best opportunities for a smooth transition from the classroom to e-learning [16]. Blended learning is seen as the more effective counterpart to the other two formats when they are used separately since it combines their "benefits" [17], [18]. Furthermore, it integrates the power and efficiency of the classroom with the flexibility and adaptability of e-learning, as it allows the training material to be tailor-made to the educational needs of each learner and at the same time to be accessible and easily shared by all.

B. Advantages and Disadvantages of Distance Education

In efforts to meet the new and changing demands for education and training, open and distance learning may be seen as an education delivery process that is at least complementary and - under certain circumstances - an appropriate substitute for the physical presence methods. Although these traditional methods are still dominating most educational systems [19], [20], distance education may lead to different ways of conceiving knowledge generation and acquisition. The last two decades have seen considerable growth in distance education and training worldwide which has revealed a variety of strengths and weaknesses [21] - [24]. The benefits of this growth can be evaluated by technical, social and economic criteria and methods that have their own pedagogical merit [25], [26]. However, there are digital divides to overcome [27] - [29], as every student needs to be equipped with tools to access quality digital learning. Even for

countries with more reliable ICT infrastructure and household connectivity, online learning delivery may be challenging.

There exists an extensive literature that showcases the advantages and disadvantages of online learning. Table I presents the main benefits of using online learning in the educational process from the learner's perspective [30], [31].

Table I. Advantages of using online learning in the educational process

Reduces costs, as travel costs and the need for a physical classroom are eliminated
Approaches an unlimited number of learners simultaneously
Provides each learner with the same content, presented in the same way or specialized, depending on the different learning needs or different groups where she belongs
The content is up-to-date and reliable, as it can be updated or upgraded quickly making the information more accurate for a more extended period of time, and it can be distributed immediately
Learning can happen 24/7, as each learner can access educational content anywhere and anytime
Offers interoperability, as e-learning is based on the internet and benefits from internet protocols and browsers. Any differences in platforms and operating systems are addressed quickly, and each learner can receive nearly the same material in the same way
Builds user training communities where learners can continue to share knowledge even if a training program is over
Accommodates a varying number of participants, as the available platforms can support numerous participants with little effort and gradually increasing costs (when the appropriate infrastructure exists)

From the instructor's perspective, additional advantages of distance learning, have been identified [32], [33]: the reuse of the produced educational course material, the increase of the number of participants in a distance educational process, and the significant cost reduction for the distribution of the lesson including the building equipment as no classrooms are needed, the salary of employees who may assist in the educational process and the travel expenses as the physical presence of the instructor in a specific place is not required.

Nevertheless, one cannot deny that some concerns also arise with the adoption of online learning in the educational process [34]. A feature that may be advantageous for one student might prove to be a drawback for another. Table II presents some potential disadvantages for learners [35] - [37].

Table II. Disadvantages of using online learning in the educational process

Social isolation feeling from the instructor or the "classmates" due to the absence of physical contact between them
Likely non-availability of the instructor if the learner needs to ask some questions
Technology issues, such as poor internet connection, machine malfunction and lack of auxiliary equipment (e.g., printer, microphone, web camera) may make the learning process tedious and time-consuming
Lack of sufficient computer skills and knowledge of new technologies to do the homework, complete an assignment or create an online account. At the same time, some learners may experience difficulties and frustration using computers and ICT
Lack of self-discipline, motivation and a fixed schedule with deadlines may lead some learners into dropping out of the course prematurely
Concerns and open dilemmas about the most appropriate method for evaluating the learner's effort during the distance education process
Health-related concerns, such as increased eyestrain, bad posture, and other physical problems

Furthermore, the instructors face a variety of problems as well [38] - [40]: spending a considerably longer time in preparing the training content to be used as educational material, the need to update this material frequently and the limited duration of its use, as well as the possibility of plagiarism either between pupils or by using ready-made material from the internet.

III. Implementation of Distance Education in Primary and Secondary Schools in Greece

A. Digital Educational Content and Related E-services and Systems

In 2011, the Greek Ministry of Education and Lifelong Learning, under the Digital School[1] (D.S.) context [41], announced important actions related to the introduction of interactive teaching and the electronic schools' management for the development and the establishment of distance school education. Towards this direction, digital educational material was produced for use by both teachers and pupils. The provision of this material aims in the constructive utilization of ICT both in the primary and the secondary Greek education. It incorporates open educational resources, along with a proposed implementation framework for the entire operation of the organization, including the research and the distribution of this digital content in the school community. A brief overview of these computer-supported collaborative learning environments and e-services is presented below:

- E-me (e-me.edu.gr): A modern, scalable, educational and social platform, developed to be the daily digital workspace for both pupils and teachers.
- Open educational resources digital repositories: There exist six (6) information systems for the organization, the documentation, the storage, the management and the distribution of the digital educational content, including over 11,500 open educational resources for primary and secondary

[1]http://dschool.edu.gr

education.

- The Greek national aggregator of educational content "photodentro" (photodentro.edu.gr): Photodentro hosts open learning objects tagged with educational metadata. It is the main search engine for open learning resources by collecting and consolidating educational content from external data sources.
- Interactive school books (ebooks.edu.gr): The official website of the Greek ministry of education that contains all the school textbooks in various digital formats.
- Advanced electronic scenarios - Aesop (aesop.iep.edu.gr): A platform of the Institute of Educational Policy (IEP) to enable teachers and pupils to design, develop and evaluate interactive educational scenarios.

In addition, the Greek School Network (GSN) provides the educational community with e-learning services, e-government services, as well as helpdesk and user support services. GSN certifies all members of the school community (schools, administrative units, teachers, pupils, and administrative staff) for access to specialized electronic services such as:

- Electronic classroom- eclass.sch.gr
- Online lessons - lessons.sch.gr
- Educational communities and blogs - blogs.sch.gr
- Collaborative documents - grafis.sch.gr
- Electronic school press -schoolpress.sch.gr
- Files sharing - myfiles.sch.gr
- Electronic mail - webmail.sch.gr
- Multimedia presentations and lectures - mmpres.sch.gr
- Electronic learning - e-learning.sch.gr
- Teleconference - meeting.sch.gr

B. Operation of Greek School Units in the Period March-May 2020

In the period from March to May 2020, the operation of all Greek school units (including kindergartens, higher education institutions, foreign language centers, and tutoring centers) was suspended due to the COVID-19 pandemic for public health precautionary reasons. Following the relevant Amendment submitted to the Greek Parliament[2], it was permitted, by way of deviation from the current legislation, to provide full distance education using technology means to primary and secondary school students who were unable to attend the educational process face-to-face. This distance education process was permitted due to the universal or partial suspension or prohibition of the operation of the educational structures. Until then, formal education in Greece supported the traditional teaching method in which the educational process was characterized by the standardized teacher-centered learning approach and delimited within the school premises [42], [43].

The ministry of education responded to this emergency by developing and gradually implementing distance learning, offering the pupils the opportunity to keep in touch with the educational process by the following means:

- Synchronous: It was implemented in primary and secondary education with online lessons through the Cisco Webex[3] platform, giving the opportunity for connecting to the provided digital classes.
- Asynchronous: The e-services e-me, photodentro and e-books along with the eclass have been mainly used in parallel and auxiliary with the synchronous distance education.
- Educational broadcasting via state television: It was mostly used by the primary school pupils providing the possibility to attend distance learning courses daily.

IV. Research Methodology

The assessment of the pupils' perceptions, attitudes and satisfaction level concerning this "all the way" implementation of distance learning education has been performed with the means of an electronic questionnaire. In order to take part in this survey, each pupil's parent had to sign a parental consent form. This online questionnaire was created using the Google docs forms service. It was called "Questionnaire for the assessment of the distance education by the pupils". The questions were close-ended (multiple-choice, matrix and rating scale) and open-ended, and they were divided into four distinct sections. The first section included questions related to the pupils' demographics information; the second one included questions related to the pupils' level of computer skills and internet connectivity; the third section included questions related to the daily engagement with online teaching (synchronous and asynchronous). The last section included questions related to the satisfaction level, the motivation to learn and the suggestions about the distance learning experience. Pupils were strongly encouraged to fill out the questionnaire, but their participation remained voluntary. The 41 pupils who responded (23 boys and 18 girls) were mostly first and second-year students (age range 15-18) with the primary school type from lower and upper secondary public education (92.7%) in the area of Southern Attica (Greece). The survey was performed in June 2020.

V. Analysis of Results

A. Pupils'Computer Skills and Connectivity

The assessment revealed that the vast majority of pupils (97.6%) own a mobile phone of some kind, 78% own a computer or laptop and about half of them (51.2%) own a tablet. 73.2% of the pupils have a camera, and all have internet access at home (31.7% VDSL up to 100 Mbps, 19.5% DSL up to 24 Mbps, 9.8% via mobile phone while 39% do not know the type of internet connection they have).

[2]https://www.minedu.gov.gr/koronoios-kentriki

[3]https://www.webex.com/

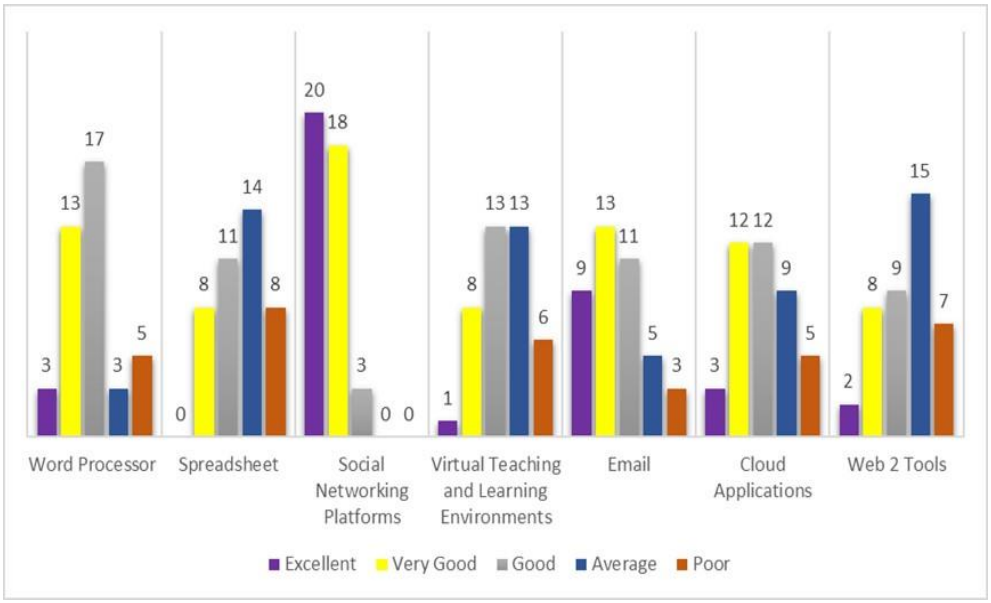

Figure 1. Pupils' skills level for standard applications

Fig. 1 shows the level of the pupils' typical computer skills. We observe that the pupils' knowledge of basic computer software applications (e.g., writing an essay or a report using a word processor), internet applications (e.g., searching information on the web or using a search engine), and cloud applications (e.g., Google Cloud[4]) is very satisfactory. Social networking platforms and chat rooms have the highest percentage (92.7%) of excellent and very good knowledge. Moreover, e-learning environments which enable the teachers and the pupils to impart and perceive education online have an average or good percentage (64.4%) of acceptance, as they have been extensively used during the pandemic. The email also is a useful tool as 80.4% of the pupils have good to excellent knowledge. On the other hand, the assessment has shown that the pupils have a rather fair or insufficient knowledge of the Web 2.0 tools (e.g., wikis and blogs), as well as of the spreadsheet process (53.7%).

Regarding the pupils' skills level for essential asynchronous training tools, 56.1% of them have good to excellent, and 43.9% have an average level in downloading and uploading files, 41.5% have good to a superior level in participating in online questionnaires, 73.2% have a good to an excellent level in participating or posting in discussion groups, and, finally, 78.1% have good to an excellent level in the online submission of written activities or assignments. In the previously mentioned cases, very few pupils (1 or 2 or 3) have a low (2.4% to 7.3%) while 17.1% have a fair skills level. The 17.1% of the pupils used asynchronous tools (email, eclass, Edmodo[5] , etc.) for distance education whereas 24.4% of them have received education via synchronous distance learning tools, such as Skype[6] , Zoom[7] and Microsoft Teams[8]. These platforms were used by some teachers instead of the Webex platform.

B. Synchronous and Asynchronous Education

Fig. 2 reveals that 14,6% of the pupils did not use any distance learning tool, because it was not mandatory (50%), they did not like the procedure (40%), they did not have the necessary equipment (5%) or the lessons' schedule was not convenient (5%). Besides, the majority of the pupils (68.3%) engaged in asynchronous education on a daily basis for 1-2 hours, 19.5% did not engage at all, and 9.7% of them spent 3 hours or more. The reasons that the pupils used asynchronous education are listed in Table III.

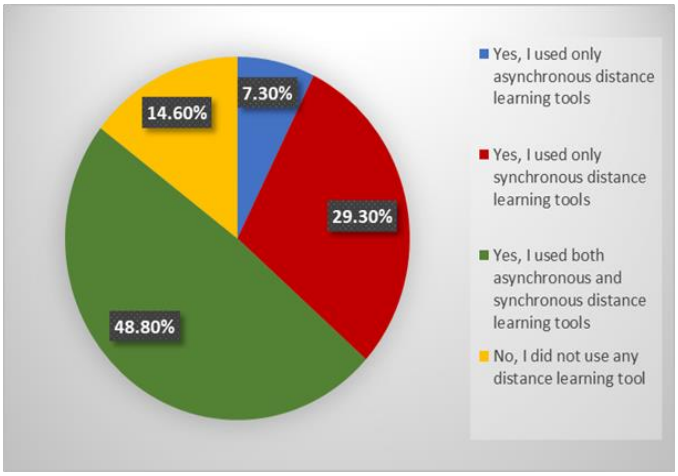

Figure 2. Use of the distance education tools from the pupils the time period March-May 2020

[4] https://cloud.google.com/
[5]https://new.edmodo.com/
[6]https://www.skype.com/en/
[7]https://zoom.us/
[8]https://www.microsoft.com/en-us/microsoft-teams /group-chat-software

Regarding the synchronous education, about one third (34.1%) of the pupils participated for 1 hour, 29.3% for 2 hours, 14.6% for 3 hours or more while 9.8% of the pupils did not attend at all. The main reason for their engagement is that they wanted to participate in the school curriculum (92.3%) while following to ask the teacher for questions in theory or exercises (30.8%) and to have contact with their classmates (20.5%). Almost half (47.4%) of the pupils encountered technical problems often during the live streaming while only a small percentage (17.5%) never encountered any of them.

Table III. The reasons for pupils' engagement in synchronous distance education

Reasons	**Percentage (%)**
Read or download relevant educational material that has been posted	66.7
Download the assignments and upload the answers	63.9
To communicate with my teacher	58.3
To communicate with my classmates	27,8
Answer online questionnaires	19.4
Be informed about the grades in my homework	19.4

Fig. 3 shows that the software used satisfied the pupils, with Skype (synchronous) and eclass (asynchronous) having the highest acceptance rates (57.9% and 40.5% respectively). Almost half of the participating pupils (43.9%) were too much or very satisfied with the distance learning experience, whereas 21.9% were little satisfied or entirely unsatisfied.

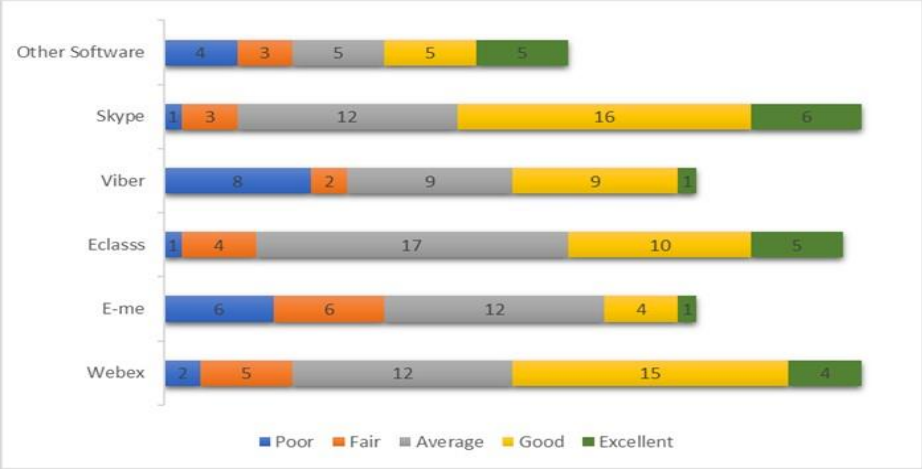

Figure 3. Pupils' satisfaction with the software used in distance education the time period March-May 2020

VI. FINDINGS –DISCUSSION

A. Positive Outcomes of the Distance Learning Experience

The positive pupils' feedback includes the following aspects of their routine: the daily transit reduction, especially for those who live far away from school or they have increased extracurricular activities, the non-stop communication with the school as well as the relationships with their classmates while they are not in the same physical space, the opportunity for repetition or continuation of the lessons (theory or exercises), the comfort offered by the home environment, the ease of time for the implementation of schoolwork, the ability to access course materials asynchronously, the possibility of getting familiar with various platforms and, finally, the avoidance of overcrowding in the classrooms. At the same time, though, only 19.5% believe that distance education reaches much of its learning outcomes compared to face-to-face learning, with the largest percentage (41.5%) choosing little or not at all.

B. Negatives Outcomes of the Distance Learning Experience

The assessment has also revealed some potential negative effects. The absence of immediacy and interaction with their teachers and their classmates in the classroom, as well as the lack of social connection and the missing of the opportunity to be in groups, constitute an aggravating factor. Furthermore, some pupils denote the following "technological" defects: the frequently poor internet connection resulting in their being absent for a long time trying to connect, the lack of a computer or the lack of necessary hardware for the seamless participation experience in the course delivery (e.g., lack of camera or microphone) and the extra hours required to learn the tools they had to use in the distance learning process. Moreover, the small participation of pupils in some lessons, the long sitting in front of a monitor and a web camera plus the lack of visual contact with the teacher made their participation unpleasant and difficult. Finally, the lack of school routine which provides structure and a sense of safety to the pupils, the stay at home looseness that they feel watching the online lesson all the time and the fact that there are no boundaries between learning at home and learning in the classroom (it is all homework now) confused the pupils and made them unhappy.

C. Pupils Suggestions

Regarding the open question "Do you have anything to suggest that could improve the distance learning process?" the pupils suggested that the online classes should be organized in smaller groups than the traditional courses. They also pointed out that the teachers' technological familiarization (seminars, user manual or step-by-step instructions for each platform etc.) should be improved. Furthermore, the classrooms could be supplied with the appropriate infrastructure that allows for lecture delivery, both online and face-to-face simultaneously.

As during the first stream of the pandemic the students' participation was not compulsory, the pupils suggested that during a potential second lockdown of schools the online participation should be mandatory for all pupils so that the teacher could be in a position to develop a fair and consistent evaluation of student work.

Regarding the education delivery, the pupils suggested that the teachers should make learning interactive by creating hands-on learning activities shown on the monitor and involve pupils in every step of the process. Pupils also suggested the systematic use of many free tools to make easier for teachers to connect with remote pupils and provide a variety of ways to engage them, i.e., embedded audio on the slides of the text being read, create collaborative presentations including infographics, posters, video, GIFs, and picture files. Moreover, the pupils suggested that their web cameras should be turned on so that they are "forced" to pay more attention and to participate in the learning process actively. Finally, the pupils highlighted the need for a better infrastructure structure, referring both to internet connection speed and better technological equipment for all involved (teachers, pupils).

VII. Conclusions – Limitations- Future actions

This paper aimed to capture and assess the Greek pupils' perceptions, attitudes and level of satisfaction of a pure distance education delivery, focusing both on synchronous and asynchronous learning which was implemented unexpectedly in Greece for the first time. The general primary impression was that pupils would miss out on their face-to-face interaction with teachers and their peers. Thus, the COVID-19 pandemic has emerged the importance of a blended, stable and resilient education system, for now, and for the future, that responds to both face-to-face and distance learning. It is vital to realize the potential of this kind of educational process and the extent of its effect on pupils as an alternative method for delivering education in the case of a future school suspension. At the same time, we have to focus on the present system's weaknesses and inadequacies and make efforts to integrate distance learning into the daily Greek educational process. It is clear that the distance education delivery, as well as all the efforts to ensure that all pupils have access to it, must be the top priority of the ministry of education planning for the next school year and beyond.

Towards this direction, as pupils were still processing the shock of the school closure and the adjusting to the new world of predominantly online classes, our primary research goal was to identify pupils' learning challenges and the unforeseen benefits of distance education which have experienced for the first time. The information provided may be used to create distance learning practices that can be implemented in the Greek educational process during future crises or be integrated into the weekly school curriculum.

The research's primary outcomes of the pupils' opinions evaluation indicate that most of them believe in the necessity and usefulness of distance education during the period where Greek schools were suspended due to the COVID-19 pandemic. Although a purely online educational process was unprecedented for the Greek educational community, it provided a satisfactory communication means between teachers and pupils, thus smoothening a possible negative feeling of social isolation and physical distancing. It also facilitated the teachers to repeat or continue to teach the educational material and find out new learning resources. The majority of pupils believe that distance education can in no way replace the traditional face-to-face process, as the positive elements of the latter prevail over those of the former. This dominant perception of the pupils comes from the fact that the mingling and the interaction with their peers is a significant part during adolescence, offering the opportunity to develop various social skills like empathy and sharing [44].

Nonetheless, these results must be interpreted with caution as the primary limitation to their generalization is the relatively small sample. Next steps should include the assessment of distance education during the second wave of COVID-19 pandemic by a larger pupil population to identify additional ways for enhancing and conducting distance education effectively. Another limitation is that the research was conducted in unprecedented times, where there was a high likelihood that pupils emotional levels could have affected their perceptions of the impact of the online transition.

Furthermore, in a future suspension of schools the actions that should be implemented immediately, according to the pupils' sample suggestions and expectations, are: a rigorous operational framework for the online lessons including a daily class schedule; a mandatory attendance or participation; an online assignment's submission as traditional grading practices are defective, and it should be replaced with more beneficial ways of measuring pupil's progress; a quick training programme in the use of distance learning tools for teachers and pupils; a provision of modern technological equipment (software and hardware) through financial aid or coupons and the improvement of internet connection speeds with significantly reduced access costs for all interested and involved participants.

Acknowledgment

This work has been partially supported by COSMOTE through a PEDION24 grant.

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