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E-learning technology: Exploring new means to communicate knowledge

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Abbreviations

MOOC: Massive Online Open Course

AI: Artificial Intelligence

LMS: Learning Management System

LXP: Learning Experience Platform

SPOC: Small Private Online Course

USD: United States Dollar

CMC: Computer Mediated Communication

DYPA: Public Employment Service

URL: Uniform Resource Locator

CSV: Comma Separated Value

PC: Personal Computer

Contents

Abstract

Evolving technology along with the need for lifelong learning and the Covid-19 pandemic, has inflicted a shift in the way adult learners communicate and interact online for educative purposes. The hype around MOOC platforms and online courses ignited the interest of several studies in the field of e-learning, although few concentrated on the communicative aspect of the subject. The aim of this study is to evaluate the learners' readiness to achieve in self-education and the impact that computer mediated communication has to the e-learning procedure. The research was made by utilizing big data tools to showcase the prominent online study fields in a global level. The data were then compared to findings regarding the Greek community. The further readiness of the user, satisfaction and motivation was measured by conducting an online survey on Greek learners. All of the above indicated that Greek adults are ready and willing to leverage online learning resources, however they recognize the lack of direct communication as one of the greatest disadvantages of the e-learning process. It is also confirmed that the interest on online courses has spiked during and after the Covid-19 pandemic. The results of this study may help in understanding how big data acquired by online learning platforms can contribute in increasing the willingness of users to participate actively. The findings can also be leveraged in the designing process of the courses, in order to shift the focus on the social features of such platforms, that promote and facilitate communication and interaction, but also increase the levels of learner's satisfaction by enhancing the user motivation, success rate and overall experience.

Keywords: e-learning, MOOCs, computer mediated communication, e-learning readiness, lifelong learning

Περίληψη

Η εξέλιξη της τεχνολογίας σε συνδυασμό με την ανάγκη για δια βίου μάθηση και την πανδημία του Covid-19, έχει μεταβάλει τον τρόπο με τον οποίο οι ενήλικοι σπουδαστές επικοινωνούν και αλληλοεπιδρούν διαδικτυακά για εκπαιδευτικούς σκοπούς. Η ανάδειξη των ιστοσελίδων που παρέχουν ανοιχτά σεμινάρια τύπου MOOC και γενικότερα διαδικτυακές εκπαιδευτικές λύσεις, πυροδότησε το ενδιαφέρον για διάφορες έρευνες γύρω από το αντικείμενο του e-learning, ωστόσο λίγες επικεντρώνονται στις επικοινωνιακές επιδράσεις του φαινομένου της διαδικτυακής εκπαίδευσης. Σκοπός αυτής της έρευνας είναι να αξιολογήσει την εκπαιδευτική ετοιμότητα των ενηλίκων σπουδαστών, η οποία είναι απαραίτητη για την επιτυχία στην αυτό-εκπαίδευση, καθώς και τον επικοινωνιακό αντίκτυπο της ηλεκτρονικά υποβοηθούμενης επικοινωνίας στην εκπαιδευτική διαδικασία. Η έρευνα αξιοποίησε την επιστήμη των δεδομένων για την ανάδειξη των επικρατέστερων θεματικών ενοτήτων και δεξιοτήτων σε παγκόσμιο επίπεδο. Κατόπιν πραγματοποιήθηκε σύγκριση με τα ευρήματα που αφορούσαν την ελληνική κοινωνία. Η περεταίρω ετοιμότητα των χρηστών, τα επίπεδα ικανοποίησης και η ενίσχυση των κινήτρων μετρήθηκε με τη διεξαγωγή μιας διαδικτυακής έρευνας σε ένα δείγμα 106 Ελλήνων συμμετεχόντων σε διαδικτυακά εκπαιδευτικά προγράμματα. Τα ευρήματα ανέδειξαν ότι οι Έλληνες είναι έτοιμοι και πρόθυμοι να αξιοποιήσουν τους διαθέσιμους διαδικτυακούς εκπαιδευτικούς πόρους, ωστόσο αναγνωρίζουν την έλλειψη αμεσότητας στην επικοινωνία ως ένα από τα μεγαλύτερα μειονεκτήματα της διαδικασίας του e-learning. Επιβεβαιώθηκε επίσης ότι το ενδιαφέρον για την διαδικτυακή εκπαίδευση αυξήθηκε σημαντικά κατά τη διάρκεια της πανδημίας του Covid-19 και μετά από αυτήν. Τα αποτελέσματα αυτής της έρευνας είναι πιθανό να συνεισφέρουν στην κατανόηση της σημαντικότητας των δεδομένων μεγάλης κλίμακας που συλλέγονται από τις διαδικτυακές εκπαιδευτικές πλατφόρμες σε σχέση με την αύξηση της προθυμίας για ενεργή συμμετοχή των εκπαιδευόμενων. Τα ευρήματα μπορούν επίσης να αξιοποιηθούν στην σχεδιαστική διαδικασία μελλοντικών διαδικτυακών σεμιναρίων με σκοπό την ενίσχυση των κοινωνικών και επικοινωνιακών χαρακτηριστικών τους, τα

οποία προάγουν και διευκολύνουν την δια δραστικότητα, την επικοινωνία αλλά και τα επίπεδα ικανοποίησης των χρηστών, ενισχύοντας την κινητοποίηση, τον βαθμό επιτυχίας αλλά και την γενικότερη εκπαιδευτική εμπειρία των εκπαιδευόμενων.

Keywords: e-learning, MOOCs, επικοινωνιακή μεσολάβηση, ψηφιακή εκπαιδευτική ετοιμότητα, δια βίου μάθηση

Introduction

The COVID-19 pandemic, in combination with trending technology applications, has led the society to adopt new communicational, working but also educational habits. From e-learning technologies applied to school and academic communities to e-conferences and corporate training sessions, a new era has begun for the means to communicate knowledge. People are required to adapt in this new reality but are not always up to the challenge.

Furthermore, in a communicational context education entails the need to interact with both fellow students and instructors in order to facilitate the learning process. So, there is a need to identify whether online e-learning courses manage to fulfill this specific social aspect of the educational process.

The adaptation of both learners and instructors to such educational practices could be considered essential to the successful individual transition to the new era of information society (Webster, 2006). Therefore, the need to understand the mechanisms, implications and needs occurring by the use of technology in education is evident.

The role of media studies in online learning can be characterized as pivotal, since many online courses feature the application of new age media in blogging, vlogging, podcasting and other journalistic activities (Coursera, 2024), but also the same media are important in facilitating the communication between learners and instructors of online educational platforms. This is the scope under which it seemed important to examine the communicative features and their impact in e-learning experiences.

The literature review of this study examines the subject under the light of three aspects of e-learning. First of all, we attempt to describe history behind e-learning and define the terms of lifelong learning, e-learning and its subtypes, in order to reach a better state of understanding regarding the rise on the use of internet technology in education.

Furthermore, an approach on relevant media literature was made in order to prove the role of communication as a mean to educate online learners. The impact of computer mediated communication and opinion leading in the online teaching process

is described and used as a basis for some of the research questions. Additionally, e-learning technologies often make use of digital media, such as videos, social networks and livestreaming in order to enhance the user experience. The modified perception of the uses and gratification theory as stated by McQuail (2010), is therefore presented under the pretext that completion of an online course is equal to fulfilling the user's needs for Information and education, Value reinforcement and Cultural satisfaction.

Moreover, a description of the influencing factors of the educational outcome and the levels of needs fulfillment is associated with the term e-learning readiness, which is defined and explained on a separate chapter of the study. Following that, an extensive list of benefits and drawbacks of the e-learning procedure is presented in order to trigger the conversation of potential findings of this research.

The main research question of the study and the working hypotheses that came along with that, are summarized in the next points. First of all, we test the assumption that online courses cover the needs of the learners to self-improve and acquire valuable skills. Then we go on asking whether the Greek adult participants are digitally, and psychologically ready to participate in the online learning process. Some working hypotheses regarding details such as the demographics role and the Covid-19 pandemic impact in the quest for lifelong learning through the internet are also made.

In order to answer the above-mentioned questions and test the hypotheses we have made use of online research tools and big data practices. All practices and the analysis of the questionnaire used can be found in the relevant methodology chapter of this study.

Finally, the results of both the questionnaire and the data analysis are presented and discussed, followed by some suggestions on further research and use of the findings in the promotion of substantial communication practices during online courses. Hopefully the readers will find this study and its appendant results enlightening to the communicative aspect of e-learning methods, and understanding of the users' habits and behavioral patterns regarding the imminent use of technology in their education.

Chapter 1: Understanding e-learning concepts

A brief history of e-learning

The term e-learning made its first appearance along with the rise of the evolution of the World Wide Web somewhere in the late 20th century (Garrison, 2017). However, attempting to define the term e-learning would be rather difficult without taking into consideration the process and educational habits that led to the use of both the internet and digital media as a means to communicate knowledge.

E-learning itself is a form of distance learning, bearing several same features, such as the ease of access regardless the place and the cost effectiveness, but also two main differences, the potential of the e-learning to create collaborative education opportunities and the ability to provide personalized educational experiences in contrast with the more self-paced and premanufactured results of the early examples of distance learning (Garrison, 2017). Regardless, we can find examples of distance learning dating as back as the second half of the 19th century. The very first predecessors of e-learning were predesigned courses that were delivered by mail to the students in a tactical basis. They would study the material and reply with their answers, waiting for more information and homework with the next mail delivery (Bouchrika, 2024).

The wake of the 20th century and the advances in technology with the invention of TV and radio, had brought yet another form of distance learning in the spotlight. Educational programs were broadcasted to a vast audience for almost 30 years, making distance learning broadly available and improving the learners experience with audio visual features (Fernández-Manjón et al., 2007). Despite improving the experience, these methods had a major drawback, one that e-learning technology resolved later on. It was a highly time sensitive form of learning which required the learner to stay put in front of his device according to a timetable determined by the broadcaster, in order to access the educational material (Weiss et al., 2006).

Going on, the evolution of computers, during the 1960s, and their use by educational institutions led to the important invention of complete teaching systems,

such as PLATO, utilized by the University of Illinois, that consisted of a display, a touch control input and networking functions, with the aim to assist learners to study, in a way similar to the e-learning systems that came later on. But all these, despite the interactivity and personalization offered, came at a cost that restricted the access and use by the public. It wasn't before the 1980's that computers were made available for household use. Then there was a shift in the way PCs were used to educate the average user through offline software designed to inform the user by utilizing the entertaining multimedia features of the device in a gamified educative way (Fernández-Manjón et al., 2007).

However, the most important milestone was the one reached in the 1990s, with the invention of the World Wide Web. The potential of the deployment of the internet as a platform to communicate knowledge and give access to educational material to all parties involved led to several types of learning methods, including online courses, and several types of cloud-based learning solutions that promoted lifelong learning (Garrison, 2017). A more detailed description of these is to be given later on, in order to define them and categorize them according to the purposes of this research.

The next step on the way was the proliferation of social media that happened in the last two decades, enabling the users to interact and communicate but also creating the need for inclusion in education through Massive Online Open Courses. That diminished the barriers of time and space and minimized the cost, giving the opportunity to everyone to study anything, anywhere, in their own pace, and share the knowledge with fellow students and instructors, forming communities that enhanced the social aspect of education (Garrison, 2017). We will later on address whether the social features of this method should be considered adequate to fulfill the user's needs for communication in the educative process.

Last but not least, the spread in the use of mobile technology offered even more independence to the learners, enabling them to access the courses of their choice on the go, but also creating the need for adapting the resources in a more accessible and less time-consuming way. Along with the new smartphone and tablets devices came the

demand for using gamification and virtual reality features to assist in the practical implementation of the acquired knowledge and the further motivation of the user, in order to maintain interest and improve the completion and satisfaction rates of the courses (Plaisent et al., 2019). By the term gamification we refer to the implementation of game features, such as point systems, rewards and other game resembling activities in non-gaming applications, aiming to increase engagement and motivation of the participant (Van der Lubbe et al., 2021). While virtual and augmented reality can create unique immersive experience and hands on practice for even the most specialized subjects, giving the opportunity to the user to have an immersive experience otherwise impossible without physical presence (Weiss et al., 2006). As good as these may sound, they also have restricted accessibility, at least for the time being, as they are not as cost effective and popular for the average learner.

Someone may easily foresee that we are in the verge of yet another change in e-learning due to the rise of AI and Machine Learning technologies that are likely to enable personalization of the offered courses. Although this is something that needs further discussion and is not in the scope of this paper.

Lifelong learning and the modern workforce

The above-mentioned series of events, can lead to the allegation that, as history shows, the media and communication means advancement has played a major part not only in education in general, but also in promoting lifelong learning and adult education, by assisting in the ease of access and motivating the adult population to upskill in order to improve their position in the labor market.

Technological advancements, as a matter of fact, may hold a dual role in the establishment of e-learning as a learning option, since they function both as a facilitator of the process and as a field of interest for the adult learner, who needs to adapt to a changing work setting, providing opportunities for hands-on training on high demand digital skills. The need for lifelong learning has become evident to adults, in the quest for knowledge and skill development, during the last three decades, through the

realization of global change in many aspects of their everyday lives and business routine (Holmes & Gardner, 2006).

Additionally, employers and companies seem to have reached an understanding that employees need further training and support, which will consequently lead to career evolution and employee satisfaction (Waight & Stewart, 2005). Baring that in mind, according to the company size, corporations tend to develop their own online learning systems, form partnerships with educational organizations, pay for the education of their employees or provide other benefits and rewards to those employees who choose to self-educate (Beinicke & Bipp, 2018). A potential question though is whether the employers acknowledge and support the decision of the employee to self-improve, the completion of the training and the acquisition of a relevant certificate.

Furthermore, we should not ignore the fact that the majority of the human capital in today's workspaces, are the people brought up in the internet era and are already familiarized with the use of technology altering the way they shop, entertain, inform or get informed and even educate themselves. Therefore, they seem to prefer e-learning to traditional learning, along with benefits that derive from the internet as a medium to inform and get informed in a convenient manner (Holmes & Gardner, 2006).

There is also another age group worth mentioning, although not dominating in number of participants as the previous age group, the people above 55 years old. Even though they are facing challenges due to the digital divide, they appear more than willing to improve their digital skills and participate in online courses. Potentially the reason is their having much spare time but also are interested in learning things that they probably did not get the chance earlier due to personal obligations. Although this group has its own pace and limitations in the learning process, that should be taken into consideration upon the design and creation process of new courses(Pappas et al., 2019).

Notwithstanding the general categorization of the workforce as adult learners, we cannot ignore the fact that the term adult includes a very broad range of learners with different socioeconomical background, different experiences, various age groups,

different levels and types of knowledge and experience, altering lifestyles and family obligations and of course different expectations when it comes to knowledge acquisition through an e-learning course (Pavlis Korres et al., 2009). This heterogeneity of the adult learners generates a fair number of questions regarding both their perception and their expectations when choosing to attend an e-learning program.

Moreover, the very same features can influence the educational outcome, since they have an impact on the learning pace and level of commitment of each individual participant. Most importantly though, these factors may have an effect in the communicative nature of the process, in an unpredictable way, either forming strong learning community bonds or creating a gap rather difficult to bridge (Angelaki & Mavroidis, 2013).

Under such circumstances, the internet and the e-learning interface play a significant part as mediums, but it is the human capital of the instructor and the learners that ultimately enable effective communication or not (Stacey et al., 2004). The role played by each of them will be examined in detail later in this paper.

E-learning software, platforms and learning modes

In the significant time range of e-learning evolution, transitioning from the World Wide Web to the Web 2.0, the mobile era and recently the AI revolution, several types of online tools have emerged, each of those covering a different set of educational needs with a different form of delivery to the user.

Similarly, there are different learning modes, according to the type of communication utilized in order to complete day to day parts of the educational procedures inside an online course. The distinction between them is mainly the promptness of content delivery to the learner, and the level of intimacy in communication between the interacting parties of an online course.

E-learning modes. In terms of communication, the courses are divided in real time synchronous communication mode, asynchronous communication mode, mixed and blended communication mode. Each of these have a set of benefits, drawbacks and intended use, hence influencing the whole learning experience.

Synchronous online courses. This mode utilizes communication technology and equipment in order to enable the direct communication of the instructor and the students in real time. The equipment needed is, apart from a main device, a camera, headphones and a microphone, in order to take part in online classes, webinars and videoconferences, communicating as a group in real time (Kyei-Blankson et al., 2016). Naturally this is the mode that facilitates communication and interaction of the participants in a most effective way, although it also removes some of the greatest benefits of e-learning, the ability to learn on your own pace and the ability to revise the material whenever you want.

Asynchronous online courses. This mode consists mainly of predesigned learning material and recorded lectures. The type of learning material may vary from tutorial videos, textbooks and guides, as well as visual material, assignments and gamified elements in order to make the quest for knowledge as inviting as possible. The most important requirement for this mode is an adequate internet connection, in order to download and access the learning materials. However, asynchronous learning might be a more time flexible solution that seems compelling to the average adult learner, but on the other hand it lacks the direct communication element of the synchronous courses (Whitehead, 2023). Although course designers have mustered online tools such as forums and live chats in order to overcome this communication obstacle, the users do not seem to respond well and usually resort in the most traditional form of online communication, the email (Angelaki & Mavroidis, 2013). Emails, in spite of being widely used for business purposes, still lack the potential to create strong learning communities, maintaining a mostly enacting role to the learning proceedings.

Mixed online courses. While the previous modes where having clear advantages and disadvantages, a combination of the synchronous and asynchronous mode seemed like a logical derivative that could potentially resolve any issues. It occurs though that even though pilling up the advantages, this method has almost the same communicative difficulties as the asynchronous courses, with the addition of the time restrictions for

the live part of the course. The above mentioned seem to have put the mixed online courses almost to the bottom of the learners' preferences.

Blended courses. Although similar to the mixed courses, the lack of online in the title is not irrelevant since it indicates that in this learning mode a combination of interpersonal and online methods is used. Even though the supporters of this mode are many, due to the fact that it can combine the best qualities of physical presence and communication with the benefits of time flexibility and cost effectiveness of online courses. Still the limitations of space make this option viable only for groups of people willing to share a classroom or those who are already in the same place. Learners' resorting to this mode are mostly higher education students or employees that receive training on the premises of the company (Li et al., 2023).

E-learning Solutions. Since we have covered the learning modes and the ways the information is circulated among the students, we will go on with describing the tools, software and platforms used to enhance the learners' experience and facilitate the instructors' work. First of all, we need to declare that the above discussed software has many shared points on their aim and functionality, however they make use of different technology and interface, incorporating the advancements of technology in every new tool, with the goal of making knowledge not only easy to acquire but also compelling for everyone, in an attempt to increase inclusion and greater dissemination of e-learning options.

LMS. An abbreviation for Learning Management Systems[1], which actually act as described, they manage every step of the learning procedure, from enrolling to material distribution and progress check of every student. They are mostly used by online course organizers (Liu & Yu, 2023).

LXP. An abbreviation for Learning Experience Platform[2], is actually an online platform that enables the user to find e-learning programs tailored to their needs, thus creating a personalized experience for each user. One might say that this type of platforms are direct successors of LMS, performing almost the same operations, as well

[1] Some of the most known LMS Systems are Moodle, Blackboard and Canvas LMS.
[2] Examples of LXP platforms are Udemy and Docebo

as providing access to engaging content within the interests of the learner, thus promoting the lifelong learning as a concept (Ryan, 2022).

Social Learning Platforms. This kind of platforms[3] are based in the communication of the users to share knowledge and learning achievements with each other. Apart from the opportunity to learn from fellow users, they also take leverage of the social media features, of liking, commenting and recommendation functions, potentially creating communities to facilitate the exchange of information and opinions (Giannakos et al., 2021).

Microlearning Platforms. Yet another type of platform that addresses the need of some users to learn something in a very easy and time effective manner. They make use of multimedia, mostly short videos and minigames, along with small textual elements in order to inform and educate the user, in a manner suitable to the busy lifestyle of most adults (Giannakos et al., 2021). Most of them are also available in smartphone apps, while also having social media elements. They are often chosen as a corporate learning option.

MOOC Platforms. An abbreviation for Massive Online Open Courses[4]. This type of online courses is typically offered at no cost. The initial concept was to create knowledge through communication and information sharing between the participants and the instructors that were also the creators and organizers of such courses. In such courses, usually categorized as cMOOCs (the "c" standing for connectivist), discussion and personal research are the main methods to acquire the desired knowledge, which is also free, open and available to everyone (Gómez Chova et al., 2014).

As soon as the market realized the potential that this type of course had had in attracting learners' interest, several new subtypes of MOOCs have emerged creating a more commercial array of courses, mainly developed by higher education institutions and regularly at some cost, losing the openness of their predecessors with the promise

[3] LinkedIn Learning and Miro are very different types of the vast category of SLPs having the social features evident on their interface.

[4] This is the category with the most widely known household names, such as Coursera, Udacity, Udemy, Edx e.t.c.

of creating value for the learner, in terms of specialization, certification, and ease of access (Fischer, 2014). This array of courses come under the general term xMOOCs, a subtype of which we will now discuss as it is the most popular for many adult learners (Gómez Chova et al., 2014).

At this point however we should clarify that the types and subtypes of MOOCs are purely for distinctive purposes and are not widely used, instead we use the term MOOCs that covers the whole range of online courses offered to a large number of people at low or no cost. Regardless, at some points of this study, it is useful to have some kind of division between the non-commercial and semi-commercial types, because they may bear many similarities but also have some important differences especially in terms of communication and knowledge sharing.

SPOC Courses. An abbreviation for Small Private Online Courses[5], which despite their name are not so private. These courses are practically MOOCs, frequently offered by the same platform but organized by different actors, while MOOCs are the guiding effort of instructors as individuals, the SPOCs are mostly organized by large scale institutions in a more structured manner, similar to the academic schedule of a live course. The number of participants varying between a few tens and a few hundreds, the courses are organized mostly by for-profit institutions. They also share characteristics with live courses, such as learner evaluation, specific pre delivered material and a stricter timeline than MOOCs, thus creating more passive learners that resemble retail consumers, buying prepacked knowledge, instead of researchers in the quest of lifelong learning. Apparently, the benefits of high-profile organizers, easy access to materials, certification and personalized features come at a cost, which is though still smaller than any similar face-to-face learning course (Kaplan & Haenlein, 2016).

As technology evolves new types of learning platforms introduce themselves to the learners. Having said that, a more extensive listing of subtypes and emerging types is both overwhelming and unnecessary for the purposes of this research.

[5] According to a thorough web search conducted for the purposes of this paper it was found that there are only few MOOC providers in our country as opposed to the SPOC providers. Another fact is that in Greek market MOOCs are kept in separate platforms than SPOCs, as opposed to the global habits

With such a variety of offered services there is no wonder why the e-learning industry constantly grows in profit, indicating that it also grows in users – learners in an annual basis. According to recent reports, the e-learning market size reached 316.2 billion USD in 2023, while the number of learners increased by 21%, with most of them being adult learners between 35 and 44 years old (Mercado, 2024). A future foresight estimates that the market size will reach 661.6 billion by 2032. The largest share is held by online e-learning platforms and mobile learning apps. The numbers seem rather impressive, especially compared to the mere 7.98 billion market size of the 2000s (imarc, 2023). The numbers seem highly affected by the Covid-19 pandemic with online learners reaching 220 million only for MOOC platforms and the market size doubling in less than five years, reaching 250 billion USD (Diaz-Infante et al., 2022).

While all software and platforms mentioned have a pivotal role in e-learning industry, only few of them are popular among learners, mostly being different types of courses, online platforms and gamified learning options. Conversely, for the purposes of this research we are going to focus on two subtypes of online courses that seem to have an established position and recognition among learners, the MOOC's and the SPOC's(Gómez Chova et al., 2014).

The selection of the above-mentioned types of platforms was made after an internet search regarding the Greek e-learning providers was conducted, it was then clear that MOOCs and SPOCs were the types mostly offered to the Greek adult learners. Moreover, according to the statistics mentioned before, the learners across the world have the tendency to choose such courses.

Defining e-learning

Attempting to define e-learning can prove quite challenging. Several definitions can be found throughout scientific papers since the appearance of the first e-learning solutions. Some of them focus on the technology, others on the educational aspect and some more in terms of communication (Phillips et al., 2012). We will present some of the definitions in an attempt to cover all aspects and decide on the most relevant according to the needs of this study.

Prior to that though, we need to clarify the difference between e-learning and online learning. While e-learning defines the educational process that uses technological equipment, online learning refers purely on the type of e-learning that utilizes the internet to communicate knowledge (Urdan & Weggen, 2000). Under that scope the term e-learning has been used long before the invention of the internet, so online learning is just a part of that, however nowadays the term e-learning has become almost a synonym. So, for the purposes of this research, we will use the broader term e-learning, which includes the use of both media and the internet in the learning procedure (Bates, 2005).

Returning to the definition debate, one of the first definitions used states that e-learning is any form of learning that uses technology in order to support student learning (Wheeler, 2012). If we accept that definition then the role of communication is insignificant and the technology mentioned is used merely as equipment.

A more communication-oriented definition is that of Abbad et al. (2014), who suggests that e-learning is "the use of information and communication technologies to enable the access to online learning/teaching resources". This ignores the instructional part and only focuses on the distribution of material.

The definition that seems to be the most appropriate, including technology, communication and educational importance, is the one given by the European e-Learning Action Plan that defines e-learning as: "the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration" (COM, 2001).

Since we have decided on a definition, we can proceed to examining the communicative aspect of e-learning from both the perspective of the learner and the instructor, taking into account the special circumstances emerging by the use of computer mediated communication.

Chapter 2: e-Learning as a means of communication

Internet as an influencing factor of information flow

Since the formation of the first network in 1990s and the emerging of e-mail as a disruptive mean of communication in that given timeframe, computer mediated communication has repeatedly altered the way that we communicate and share information online by adding new tools to the equation of efficient information exchange (Pachler & Daly, 2011). Be it online chats, forums, video conferences, boards of discussion, social media sharing or anything in between and recently even above, everyone has at some point used one of those tools to communicate online.

The internet, providing ample access and flow of information and ways to communicate them, has revolutionized social interactions, business exchanges and everyday life processes, such as paying bills, shopping and similar things. In that terms, education cannot be an exception to that, and it is only expected that education should be an active participant in the so-called information society (Webster, 2006). This need is also evident by the change in the work setting of many of people, since they are expected to be informed in work-related matters and be able to use the new equipment provided by the rapid technological evolution. So, a high demand for new skills has created the need to educate the workforce in order to adapt to the change. That being said, both the employers and the policy makers should facilitate the access of employees in e-learning courses, giving them the tools they need in order to adapt in a rapidly changing work setting (Schweizer, 2004).

But what exactly is defined as computer mediated communication and what is the role that it plays in the educational process, is to be addressed in this chapter. The term CMC has been attributed various definitions through the years of technological advancement, this evolution is probably the reason of the debate around the term. For the purposes of this study, we chose to follow the definition of Lee & Oh, 2015 that describes CMC as any kind of “human communication through networked computers, which can be synchronous or asynchronous and involve one-to-one, one-to-many, or

many-to-many exchanges of text, audio, and/or video messages". This definition seems to take into consideration both the connectivity and the content as a part of the communicating process, which seems rational, with the reserve that nowadays computer is not the only networked device, so if we were to alter something that would be the part concerning the connectivity to be altered as follows : "through any device able to connect to the network". But we should further examine what are the communicational perspectives regarding the network.

Frequently the attribution of the internet and relevant technology in learning is disregarded, by solely recognizing it as a vessel that carries the information and not as an active factor influencing the efficiency or the outcome of the procedure (Garrison, 2017). However, we should consider the feeling of sharing information in a condescending manner, just sending a text, in contrast with sharing the exact same information in a compelling video or image setting that includes the main message. Additionally, the evolution of Web 2.0 provided both the administrative LMS software and communicative tools to make sharing of the information an interactive experience, including video chats, podcasts, webcasts and online sharing spaces. The media rich content is enabled by the evolution in computer mediated communication and it increases the level of attention that the message gets (Caladine, 2008).

The educational value of the internet is recognized even in earlier stages of education, since it provides access to limitless information with a push of a button. Although there are limitations regarding the validity of the sources, there are even collaborative sources of knowledge, such as Wikipedia and online libraries (Weiss et al., 2006). The reader should now consider the e-learning courses as an opportunity to access relevant and validated knowledge online.

Some may argue education is a much different process than communication. In an overly simplistic approach, the information flow requires a transmitter and a person willing to receive that information. So, in an educational context the instructor has the role of the transmitter, gathering useful information that then communicates them to the learners who are willing to receive them (Webster, 2006). Clearly, e-learning

environments include the network as a means to connect the interested parties and complete the educational process. Considering that, education, including e-learning, is a way to communicate knowledge.

In a communicational context education entails the need to interact with both fellow students and instructors in order to facilitate the learning process. So, there is a need to identify whether online e-learning courses manage to fulfill this specific social aspect of the educational process. Various e-learning solutions aimed to create compelling learning environments that not only transferred necessary learning assets but also promoted communication and collaboration of the users, but even though having good intentions there is no evidence of them succeeding to do so. With most of information coming in a form of a vast array of digital media sources, the greatest challenge in today's learning software is to find a compelling and easy way to concentrate them and present them, in order to increase usage by the learners. So, content management with proper LMS systems is considered essential in succeeding to disseminate information effectively (Caladine, 2008).

Furthermore, computer mediated communication, even though providing the tools to create synchronous and asynchronous forms of interaction, is dependent on participating of the users in order to be effective. This means that if someone is willing to participate then CMC can have a great effect in terms of discussion over the learning subject of a course. The reality is that some learners are more comfortable to participate in asynchronous means of communication because it gives them more time to process the information acquired by the learning material, while others prefer real time communication. There is also a number of people that rely on social interaction in order to motivate themselves to study, so creating a sense of community within the online learning environment might prove beneficial in promoting commitment in learning procedures (Pachler & Daly, 2011).

Taking into consideration the different approaches of the learners in regard with participation in discussion and communication within the group of learners, social media

can play an important role in facilitating the adaptation, since they are a broadly accepted means of communication.

The adaptation of both learners and tutors to such educational practices could be considered essential to the successful individual transition to the new era of information society and massive sharing of information online through MOOCs. With that in mind we will now proceed to elaborate the role of the instructor in an e-learning setting.

The role of instructor in MOOCs

The personal qualities but also the position of the instructors inside the institutions, being highly esteemed, justifies the perception of them as opinion leaders by the students. The role itself confers great importance on the process of educating and transmitting relevant information, especially when that information falls into one's field of expertise.

Analytically, students on the same field form communities through which they discuss, process and absorb information, giving another communicative dimension in the educative process. It is within the power of the instructor to support, enhance and feed the communities with reliable information.

Apart from the prestigious leading position of the instructor, his age, level of education and expertise, along with the amount of time he spends addressing the team, can increase the potential of positive influence in a traditional classroom setting, and contributes in formation of respect, trust and recognition by the members of the learning community (Katz & Lazarsfeld, 2017).

But the kind of influence an instructor can have over the team if we remove the ability of the learners to communicate directly in order to recognize the leading features on him, is something to be discussed, since in most online courses the opportunities to communicate with the instructor seem to be limited and sometimes in an asynchronous mode that probably diminishes the possibility of forming a community.

In early MOOC history, when the idea was the cultivation of collaborative sharing of knowledge the role of the instructor was clearly leading the learners to acquire relevant information and shaping opinions on the subject of study (Gómez Chova et al., 2014).

While the role of the instructor is now diminished because of the modern format of MOOC courses that requires information to be accessible by the learners anytime within the duration of the course, he still has the opportunity to communicate his ideas by taking advantage of synchronous modes of learning such as videochat and videoconferences, in which the participation and communication is conducted in real time and gives the opportunity to express and verbalize relevant questions and get immediate answers exactly as one would do in a real classroom setting.

Furthermore, an instructor of online courses has to pursue communication with the students, provide ample guidelines and feedback, and give meaningful textual and online learning material in order to enhance the ability of self-paced learners to achieve.

In the setting of e-learning, when the learner might feel isolation, the support and motivation received by the instructor, seems to be of great importance in terms of enhancing participation, creating a positive learning experience and improving the overall quality of the provided service (Duan et al., 2024). Of course, none of this can be done without the support of the institution and the possession of the necessary technological equipment, (Kyei-Blankson et al., 2016) but these are mostly factors of influence of e-learning readiness, that we are going to address in more detail later in this study.

To sum up, as it has been already implied in the previous subchapter, the levels of acceptance and participation in e-learning environments are clearly dependent on the learner's mindset and good will (Zhang et al., 2024), so his familiarity and readiness to participate will be examined in a later stage of this research.

Satisfying learner's needs

Since we have contemplated the role of the instructor as a transmitter of relevant information and, in terms of CMC, the internet as the medium to transfer the

information to the learner, then we should consider that the use of the network to access e-learning courses might fulfil some of the learner's needs. As a matter of fact, this is probably one of the earliest admissions in the literature of communication (McQuail, 2010). Our initial point of view on that was oversimplified just to indicate that the communication process is covering the need of the learner. Of course there are other factors influencing his choice, such as motives behind that selection, and the sense of achievement upon one's goals.

But what kind of gratifications can a learner seek, when choosing internet to self-educate? The type of content shared is the one making the distinction of the kind of satisfaction gained easily perceived. Since the internet provides access to the learner in educational material, along with the opportunity to communicate, this apart from the need to educate, can also fulfill the need to reinforce the learner's value through mastering new skills, the need for cultural improvement and even the need for communication and socializing in some cases (McQuail, 2010).

Dependent on the exact level of satisfaction of those needs and the opinions of the user though, is the evaluation of the overall success of e-learning (Beinicke & Bipp, 2018). Thus, since the satisfaction of the learner's needs is dependent on many factors, we are going to address the factors leading to satisfaction and success at a later point.

At this point we should clarify that for the purposes of this research we are going to test the above-mentioned satisfaction of the learner's needs by focusing on the local available MOOC courses. While satisfying a user's need is not limited within the Greek domain, especially since one of the greatest benefits of online education is that is not space restricted, a decision was made to concentrate on the Greek resources because of the reasons stated below.

First of all, this decision removes the language barrier both in terms of attendance and in terms of communication, at least with the instructors and administrators of the course. Another reason is that, while there are a lot of available learning resources online, the value of certification and the level of authority of a Greek institution, are undeniable and are more likely to be recognized by local employers. Last

but not least, the credibility and consequently the quality of provided learning material is easier to be confirmed for the local institutions.

The Covid-19 pandemic as a game changer for e-learning

While both CMC and e-learning solutions were widely known and amply used prior to the Covid-19 pandemic the way that we were forced to operate in terms of social contact, and the continuous lockdowns have forced everyone to use a little bit more technology to communicate in personal, business and transactional levels.

Computer mediated communication was somehow enhanced during Covid-19, since people needed to learn how to communicate things that they never before needed to, through an array of devices. The interactivity and increase in the use of video chatting tools was merely one aspect, while users learned how to use devices to express emotions, in video and text , but also grasped the opportunity to benefit from the extensive use of the internet in order to familiarize with the possibilities it offered for access to information (Kurebayeva et al., 2023). This observation might lead to the assumption that people have learned how to leverage the provided technology and constantly improve their digital literacy until nowadays and hopefully in the years to come.

Since all everyday activities had been transferred in an online setting, learning could not be an exception to that. Students of every age were forced to educate themselves online, however this was not necessarily something they wanted rather than something forced upon them by the circumstances (Aristovnik et al., 2023). In such an occasion when e-learning systems and infrastructure were not exactly able to cater the increased load of students (Maatuk et al., 2022), the benefits and drawbacks of e-learning came to life, along with the need to measure and improve e-learning readiness of all influencing factors.

Prior to engaging to the debate of advantages and disadvantages of e-learning, we should declare though that challenges of regular university classes were more significant than those of MOOC platforms due to the compulsory nature of public education. The perceptions of adult learners were very different, due to the e-learning

experience being more of an opportunity to upskill and a way to spend their free time effectively, which was confirmed by the rise in participants of MOOCs during and post pandemic (Mercado, 2024).

Since this study focuses on adult population and the use of MOOCs, the benefits and drawbacks may differ than those of higher education students. There are undoubtedly some common perceptions though, regarding the usefulness of e-learning (Maatuk et al., 2022). Given that, we will go on to the next chapter to recognize the benefits and drawbacks of MOOCs. We will then elaborate the term readiness and explore the ways that it may help to overcome some of the challenges in e-learning.

Chapter 3: Leading e-learning to success

Recognizing strengths and weaknesses of MOOCs

While Covid-19 created a spike on willing participants of MOOCs, and ignited an interest on the improvement of their quality, the main features of these remain unchanged. Some of these features are the reasons why learners choose to attend them while others are reasons to avoid them.

Benefits of MOOCs. The first and foremost benefit of MOOCs is the fact that they remove the place and time barrier of a traditional learning experience. Being available online, especially asynchronous MOOCs, provide the opportunity to the learner to participate in them without the need to commute and in his own convenience.

Another important advantage is the fact that they are offered either at no cost or at a very low price, especially when compared to the price of similar in-person courses. So, they offer the opportunity to gain important skills at a fraction of the cost . Although, at this point we should mention that the recent trend is to charge not for the attendance but for the certification of the skill, thus adding some extra cost, but mainly invalidating one of the most important advantages of MOOCs (Kaplan & Haenlein, 2016).

Moreover, the list of available MOOCs is practically endless, giving the opportunity to the learner to choose the field of study he desires, sometimes provided by high prestige universities. This ability, given to the learner, influences positively the level of readiness by providing access to a vast array of skills.

Drawbacks of MOOCs. The most obvious drawback is the asynchronous mode of most of the courses, which sometimes leads to disruption in communicative process, especially when the learners are set in different time zones (Gómez Chova et al., 2014). Communication in global MOOCs may prove quite challenging in many aspects, not only because of the mode of learning, but also because of the large number of participants that makes it hard to connect in any other way than discussion boards and forums, and

the cultural divide, since participants can enroll from all over the world (Kumi-Yeboah et al., 2015).

Another disadvantage of MOOCs is the fact that they offer little or no opportunity for practicing what you have learned. Practice is meaningful for some learners since it gives them the necessary feedback, confirming the result of their effort, so compete lack of vocational training practically removes some of the value of earning a skill, when this is purely in a theoretical level (Pozgaj & Knezevic, 2007).

Last but not least, MOOCs promote the ideal of open accessibility to knowledge, when contemplating the term digital divide and the lack of any meaningful technical support on behalf of the organizers, this is not particularly true (Holmes & Gardner, 2006). While we surely can overcome some of these obstacles with proper design of the courses and enhancement of social interaction, the rise of other types of courses, based on a similar format but improving some elements and reducing the numbers of the learners might prove more successful in the future.

Participation and Readiness

The implications of Covid-19 pandemic upon the way people communicate and educate themselves, and the broad use of e-learning tools as an alternative to continue operating in all levels of education, from primary schools to higher education institutions, has made the need to assess the efficiency of online learning evident (Zine et al., 2023).

Lifelong learning among adults through MOOC courses are no exception to that need, since the rise in numbers of people participating indicates that there are numerous people, who are trying to achieve in personal and professional level, facing almost the same challenges as every student during the pandemic. And while students have returned to real classroom conditions, lifelong learners still use e-learning as the main source of obtaining knowledge, mainly because of the way that it suits the busy lifestyle and obligations of most adult learners at a fraction of a cost of an in-person course (Pavlis Korres et al., 2009). So, it is highly important to assess the levels of e-

learning readiness in order to provide meaningful results and improvements to the participants of online courses.

The term readiness, is pretty much self-explained, as the word states, readiness is the state of being ready for something, be it a change in the traditional practice in a field or a challenge to overcome (Majid & Yanduri, 2022). The exact association of this with e-learning though is something that needs further elaboration.

As a matter of fact, the state of being ready for e-learning entails a series of variables to be considered. Since we are examining a process whose success depends on multiple participants, means of communication and digital tools, we should take into consideration every aspect of the e-learning practices. To do so, we cannot consider e-learning as a uniform process, we need to break it down to the subparts and different type of actors within it. Thus, there are multiple different models utilized to evaluate e-learning readiness of each counterpart (Kolo & Zuva, 2020).

In order to clearly divide the variants that immediately affect the e-learning process we need to separate the counterparts in two levels. The first one concerns the learning environment and it includes every aspect of organizing an e-learning course, while the second one regards the learner specifically.

Namely the group of factors that define the readiness on organizational level are policy and regulation readiness, institutional readiness, and infrastructure readiness. Each of the above can be further examined in sublevels, for example institutional readiness entails both the organization part, and the instructor part. Infrastructure readiness includes the network readiness, systems readiness and equipment readiness.

Many of the above-mentioned sublevels will be examined later on, but some of them, such as policy and institutional readiness, cannot be assessed through this paper, since they are subject to factors that were not in the intentions of the writer to research. Although some observations regarding these parts are made here bellow.

Institutional readiness. While addressing institutional readiness, the following aspects should be taken into consideration. The readiness of the institution to design and implement relevant to the demand e-learning courses, their levels of access and

ability to handle an e-learning platform effectively and of course the readiness of instructors to adapt in the new conditions of teaching online (Kolo & Zuva, 2020). Regarding the instructors' levels of readiness, we have already discussed some of the criteria that should be met in order to achieve in the previous chapter. Regarding the rest of the factors, only a few things can be summarized at this point.

In terms of institutional readiness, an observation of the writer is that all public universities in Greece have at present an e-learning department and a website listing the available courses, while not all have the same volume of offered courses, which seems rational though since not every institution has the same resources and funding. Also, almost all private colleges offer similar e-learning services, however it is difficult to evaluate such a vast range of information without conducting relevant research, so the value and level of acclaim cannot be estimated at this point. A logical assumption though it would be that they would not have the permission to operate if they did not comply with some quality standards. Another observation is that there are innumerous private organizations in the field of education, some of them being also known as certification institutions, that regard the online courses as an added value to their offered services and yet another opportunity to generate revenue.

However, the evaluation of readiness in an institutional level is not limited to the quantity of offered courses, it also entails other factors such as digital readiness of the faculty and the administration, up to date technological equipment, access to LMS tools and other factors that can prove the overall efficiency of institutional e-learning (James-Springer & Cennamo, 2021). Although, this kind of evaluation would require qualitative research features and direct communication with the organizers of MOOCs, which is not within the aim of this study.

Policy and Regulation Readiness. While the above mentioned, regarding the institutional level of readiness are based on observation and mere assumptions, a shift in the policy of the Greek government regarding lifelong learning in general, but also e-learning methods specifically is evident from the time of Covid-19 pandemic. The cooperation of DYPA, the Public Employment Service of Greece, and the globally

esteemed course organizer, Coursera, during 2021 was the first of many actions that promoted the participation of the unemployed people in Greece in online courses, in an attempt to provide them with skills that would help them return in the active workforce of the country. The organization later on invested in even more agreements with similar purposes, that can be found online in its official web page (DYPA, 2020).

However, the official information of the training outcomes of either that or any other similar initiatives are very little. Based on the few press releases found in the official website of DYPA, the participation of the Greek citizens in the courses was great. Analytically, 24.626 participants enrolled in 31.377 classes and spent 400.489 learning hours online and gained a certificate of attendance. Nowadays, the organization aspires to certify 500.000 citizens in digital and green skills by 2025. This estimation derives from the fact that Europe has deemed 2023 as the European Year of Skills, organizing in cooperation with the state members several activities to promote training of the EU citizens (DYPA, 2023).

Under the scope of regulation, there is a perception of already established standards regarding the e-learning providers, which are seemingly present and published throughout every organizer's website. Although in an ever-evolving technology-oriented field, regulations should be constantly reassessed accordingly.

Although there are plenty of indications showing that both institutions and the State in Greece are committed in achieving e-learning readiness, and are working their way to that direction, it is beyond the scope of this research and the intention of the writer to evaluate their progress at the time being.

Infrastructure readiness. The term infrastructure includes all technology-oriented requirements in order to give the ability to both the organizers and the participants to succeed in their educational goals without any impediments. To name just a few, hardware, network, support and recovery mechanisms, availability of e-learning platforms and their correct implementation within the organizations, indicate the levels of readiness (Majid & Yanduri, 2022). The infrastructure readiness is a really important success factor in the e-learning environments, since the whole learning

process is computer mediated. The sub-elements of readiness presented here are subject to different actors' efficiency.

On one hand, as far as software and systems are concerned, there is no need to create anything from scratch, unless if there is the desire to create something innovative and/or tailor made. Effective e-learning tools are already available online and are evolving constantly. The need for appropriate hardware infrastructure and the human resources that know how to handle that infrastructure though is really important. The IT departments of the organizations have the obligation to make sure that the relevant information and communication within an e-learning system runs flawlessly. The large amount of space needed in order to store the learning material and the internal network efficiency are key factors to both the distribution of information and the communication between instructors and learners (James-Springer & Cennamo, 2021).

Last but not least the broadband network speed and reliability are key factors to assure the learners' side of communication with the system. There is no e-learning without connectivity. So, it is substantial for the state to ensure that every citizen in general and specifically any online student has the proper access to the network, in order to have equal opportunity and access to knowledge and learning and avoid the creation of a digital divide on behalf of the state (Holmes & Gardner, 2006). The access to the relevant equipment, in order to avoid the above-mentioned divide is to be examined along with learner's readiness.

Content Readiness. With the term content we mean any available learning resource that promotes e-learning. It includes both the available platforms and courses, as well as the learning material and tools distributed through them (Kolo & Zuva, 2020).

The term content readiness entails the training quality of the learning material, the ease of access to it and the satisfaction of the user upon his overall information assimilation. Of course, in order to achieve those, all previously mentioned readiness factors should be present. Some even imply that content readiness is a part of institutional readiness, although available infrastructure also has a role in the richness of the delivered format of the material. In an information society where video, chats and

even other digital interactions, along with networking and sharing them online play a large part on how compelling the content and the educational process are, content itself has its special part in the online learning process (Caladine, 2008).

The richness in its format though is not the key factor, quality of the content plays the most important role, especially when it comes to MOOCs where the value of the program is mostly the quality and ease of access leading the learner to higher chances of completion and satisfaction. In order to counteract for the drawbacks of MOOCs, especially the massiveness of participation and lack of personalization, designers of MOOC courses should pay extra attention to the content quality, constantly getting users feedback and improving functionality (Walji et al., 2016). Concluding the discussion around content, it is within the intention of the researcher to explore the availability of up-to-date content by examining the available MOOC and SPOC courses in Greece, along with their relevance to the trending skills in demand. As previous observations regarding the adult learner have indicated, the motive behind deciding to self-educate is to obtain skills for improving one's employment condition or learning something interesting in order to self-improve, so such a comparison seems suitable in order to determine content readiness (Holmes & Gardner, 2006).

Learner's readiness. The part regarding learner's readiness was intentionally left for the end of this section. Partly because learner's readiness depends on a vast range of personal features and skills, but mainly because it is the main focus of this research to determine learner's readiness to participate in online courses in Greece.

Since the role of other readiness factors, apart from the learner and the instructor, is mostly facilitating communication and educational process, it is only relevant to shift the focus on the living participators of the knowledge equation. And while we have examined the role of the internet as medium and the role of the instructor as an opinion leader and a constructor of communities that promotes knowledge even in a remote setting, little have we said about the role of the learner in the online domain (Aparicio et al., 2016). From now on the focus will be on the sub

qualities that an adult learner should have in order to be able to participate actively and effectively in the self-paced e-learning process.

Digital Readiness. While we have already discussed the importance of infrastructure and online access for the learner, this is merely one part of the term digital readiness. Yet another important factor is that the user owns or has access to devices (desktop, laptop, tablet etc.), equipment (headphones, microphone, camera) and software that are up to date. Without that tools participating in any course would prove impossible to achieve. The importance of the prior mentioned equipment being updated is great because it increases the ease of access and enhances the learning procedures (James-Springer & Cennamo, 2021). An empirical observation of the writer is that, considering the rapid change in the field of computing anything older than 5 years might be perceived as outdated.

The digital readiness of the user also involves digital literacy, which means that one has the ability to operate in a digital environment, to use applications and perform tasks required in order to participate in the educational process through his device (Loock et al., 2022). This means not solely the ability to use widely known features such as office applications, web search and social media, but a deeper understanding of the way a device works. Other critical features of digital literacy are the ability to adapt and learn to use new tools and devices, and the willingness to learn new things not only regarding your field of choice, but also learning to use new tools that may assist a learner in the quest for knowledge or even put gained knowledge into practice. Also, the ability to interact and operate within the learning platform is critical in order to gain access both to the learning material of a course and the learning community as a virtual place to exchange opinions whenever possible. This means digital literacy is in general a positive mindset against technology and its new features along with the up-to date equipment and software, as well as an adequate and reliable connection to the internet, and is a prerequisite in order to enhance knowledge, learning experience and participation. Ultimately one may not be able to engage properly in the e-learning procedure, thus rendering him unable to complete the course. This factor is of great

importance especially in MOOCs, where the number of participants is so large, and the format of the course is so self-paced that, if a learner cannot construct part of his knowledge, then even request for support from the organizers might prove challenging.

Psychological readiness. Psychological readiness is mostly a state of mind than a set of features of the learner. Some of the factors determining whether the e-learner is ready to achieve or not, have a lot to do with his personality and cannot be instilled into him, he either has the mindset to self-improve or not . Some other factors though depict the opinion that one has about the effectiveness of e-learning, hence improvement of the other factors of readiness might have an immediate effect on the determination of the user to participate in an online learning experience (Zhang et al., 2012). Another important ability of a conscious e-learner is the ability to self-evaluate in order to be able to assess whether he is successful in any given time and find ways to make his education efficient, so self- regulation and self-evaluation can lead to self-efficacy which is one of the key factors when it comes in succeeding in a self-paced environment(Loock et al., 2022). Finally, commitment in completing tasks in the most efficient way is certainly another benefit of well-informed users, since the keeping of the timeframes within the learning system depends solely on the learner, procrastination is not a quality that is especially desired when it comes into unsupervised MOOC courses (James-Springer & Cennamo, 2021). In a communicative aspect, critical thinkers with the ability to form meaningful connections are most enabled to fulfil their need of both communicating within the e-learning environment and absorb the relevant information, being able to both interact and contemplate things as opposed to the social learners who might find it difficult to operate in lack of a more social form of communication, or even a face-to-face setting(Garrison, 2017).

Motivational readiness. While the term motivation seems similar with the psychological factors, they are not to be confused. Motivation needs a clear goal to pertain to in order to exist. So, in terms of e-learning lack of motivation could lead in a potential drop out of the course. Another important feature of motivation is that it is dependent on external factors and the psychology of the learner, So, motivational status

can be altered along the duration of a course by a potential failure or loss of interest (Loock et al., 2022).

Having said that, an ample offering of courses, so that the learner can choose the one that serves his goals better, along with captivating material, can improve the motivation of a learner, while at the same time improves the participation and chances of completing a selected course (Shao & Chen, 2020).

Achieving engagement and positive feelings to the user, along with the sense of community can really have positive effects in keeping the user's motivation intact (Kahu & Nelson, 2018).

Yet another factor that can help retain motivation of the user in high levels during a course is the active presence of the instructor along with provided feedback, in order to give the learners the sense of accomplishment, which in most cases will keep their eyes to the ultimate goal of completion (Kyei-Blankson et al., 2016).

Following this part of literature, an assessment of all aspects affecting the adult learner's readiness and satisfaction will be conducted in order to address the research questions and working hypotheses of this study.

Questions and Concerns

Prior to proceeding to the description of the methods used in this study and the reasoning behind that methodological approach, there is a need to present the research questions and working hypotheses to the reader.

In the process of studying the theories and characteristics of e-learning and lifelong learning we have noticed a possible connection between the demographics of the users and the completion of the selected e-learning course, so the first research question would be:

(RQ1): How do the demographics (gender, age, level of education, employment status) of a learner impact his ability to complete the e-learning program of his choice?

(RQ1a): How are the demographics of a learner affecting his opinion regarding e-learning as an educating procedure in general?

Moreover, in terms of lifelong learning when associated with the work setting, there is a suggestion that completion of a program may affect the employment status of a learner. If so, our first hypothesis would be that (H1) completion of an e-learning course leads to a positive career change, be that a raise, a promotion or any other rewarding career outcome.

As a second step, the writer went on exploring potential communicational patterns and associations between e-learning and major theories of mass media and communication. Following the relevant literature study and contemplating the effects of computer mediated communications (Pachler & Daly, 2011) in forming meaningful connections between the participants, as well as instructors (Kyei-Blankson et al., 2016) of an MOOC or SPOC course, the following research question was formed:

(RQ2) Are participants in Greek online courses using the available CMC means to communicate effectively with fellow students or/and instructors?

(RQ2a) Is the learning outcome affected by the potential lack of direct communication?

Moreover, while contemplating the application of the reformed theory of uses and gratifications as documented by McQuail (2010), we suggest that (H2) there might be a connection between the learners' completion of an online course and their perceived level of satisfaction according to their needs.

Looking into the global market figures, along with studying recent scientific articles on the Covid-19 effects upon general request for online courses we can also assume (H3) that the numbers of Greek adults attending MOOCs and SPOCs during and post Covid-19 pandemic were increased (Diaz-Infante et al., 2022).

Ultimately, following the study around the term e-learning readiness(Attwell, 2006) and the factors that determine the learner's readiness specifically (Vilkonis et al., 2013), we propose that some conclusions could be made by managing to answer the following research question and its sub questions:

(RQ3) Are the Greek participants of online courses ready to succeed in e-learning, when assessing the readiness terms overall?

(RQ3a) Do online learners in Greece have the required level of digital readiness?

(RQ3b) Is the necessary infrastructure and equipment available to online Greek learners?

(RQ3c) Do the individuals in Greece have the mentality to complete an online self-paced and self-motivated course?

(RQ3d) Is the Greek market providing adequate alternatives in e-learning resources relevant to the trending skills required in a constantly evolving labor market?

So, now that the research questions have been clearly stated we should go on explaining the methods that are going to be utilized in order to reach the intended answers and conclusions of this study.

Chapter 4: Methodology

Describing the process

This research is utilizing data analysis as well as quantitative research methods in order to answer the already mentioned research questions, so it should be classified as mixed methods research, conducted over the internet. The initial intention was to base this study on data analysis as much as possible, although from the initial conception of this subject and the research planning, both the supervisor and the researcher have detected the potential setbacks and challenges of appropriate data collection. This is the reason why alternatives, such as conducting a survey on learners' insights, already provisioned in the proposal, were utilized in order to make this research immune to the limitations of the potential denial of the providers to share their data with the researcher. Proceeding, the exact steps of the research procedure are extensively described below.

As a first step, an extensive web search was used to determine to which of the local and global market e-learning platforms would the research focus. The range of the findings was so vast, heterogenous and time consuming, that led to the necessity to shift the focus on the Greek e-learning market. The selection of providers was made according to the authority of their official web pages as well as the update status of the web pages that was clear after visiting each one of them (Papanis, 2011).

According to the results of the web search for the Greek market, a mailing list was compiled, consisting of the name of the institution and the e-mail contact of the helpdesk, the person responsible for data handling and GDPR Compliance or both when available. Explicitly, the selected institutions consisted of seven Greek university e-learning course providers, and two providers of the private sector. Free, self-paced MOOCs were offered by one private and one public organization, while the other seven offered paid SPOCs that had a specific duration.

A request was then sent by email to these institutions asking them whether they would be willing to contribute in this research by providing the following sets of data: the list of actively provided courses at the time being and anonymized user data of the learners for the last 1 or 2 years. The aim was to determine the availability of courses

out of the first dataset along with the array of skills acquired after the completion. The second dataset, consisting of user progress and completion data was to determine the readiness and motivation of the learners, as well as the satisfaction of the need to educate themselves.

A total of 12 recipients (since some institutions had more than one authorized contact people) were sent this request, and about a month later a reminder email was sent as well. From the 9 institutions only 6 replied, however all the replies were negative, while the rest of them never replied to the email. One of the organizations that replied was one of the two MOOC providers but they were rather vague stating they are unable to fulfill the request with no further elaboration. The rest of the responders were the e-learning departments of 5 Greek universities, their answers were similar, stating that they are unable to cater the request due to technical or time limitations and due to the inability of their systems to export that kind of information automatically. However, they all suggested that information regarding the courses could be gathered from their web pages, providing permission to use the publicly available details of the offered courses. At this point, one can assume that the institutions either do not possess the software or they do not have the digital readiness to use the LMS solutions properly, since this kind of data are easily available through e-learning platforms (Majid & Yanduri, 2022). Another possible explanation was them being unwilling or uncomfortable to share that kind of data with the researcher. This fact indicates that the level of e-learning readiness on behalf of the institutions is probably low, and it should be improved in order to succeed in the evolving digital learning setting of present times.

Returning to the research methods though, as an alternative, a collection of data by 10 websites was performed manually by visiting each of the web pages, in order to collect at least the information concerning the courses.

Regarding the user data, a self-completion questionnaire was formed by using Google Forms platform and was distributed by email and social media sharing. The questionnaire was focused in the Greek population, so Greek language was used. Both

the platform and the distribution methods were selected having the ease of access and completion in mind. The same features have facilitated the data collection process, regardless of the limitations that this choice has in terms of the types of questions used and the accuracy of completion by the responders (Bryman, 2016).

Moreover, in order to validate and compare the local findings, we have collected an array of datasets, showing skill trends and relevant information of renowned global providers, over the internet. Details on data collection, handling, big data analysis and visualization will be given in the subsections of this chapter.

Data collection

The data analyzed for the purposes of this research derived from various sources. Some were handpicked online; some were downloaded from validated sources and some were gathered from the above-mentioned questionnaire.

The handpicked data collection method concerned the details of online courses and served as an alternative to the unwillingness or inability of institutions to provide official data. Regarding the institutions having less than 50 available courses, details for all courses were gathered, while for the more populated websites we gathered randomly 50 available courses according to either the recommendation function, or the most recent function, finally wherever that was not possible a simple browsing of the pages was implemented and several courses were handpicked from each page up to the number of 50 courses per provider. All data were collected in Greek language, and then translated in English, because the English version of some of the courses' pages was outdated, the data used to form the network of courses per field. A total of 300 active online courses were concentrated in this dataset.

Specifically, the structure pattern followed for almost every single course page has led to a spreadsheet containing information, about the course and institution name, a short description of the course, along with its cost, duration, learning mode, type of certification, and field of study.

Apart from Greek online courses details, all web data collected were publicly available and accessible. The first dataset was a categorized skills list along with the skill type and labor market field for the years 2015 to 2019. There was also a field with a

rating of the importance according to the appearance count of each skill to the users' profiles of people holding a position in a relevant profession. The weight is measured in a ten-degree scale (Zhu et al., 2018). More information on the data contained in this dataset and the collection method are available online. The dataset was obtained from the World Bank Group and it was a result of their partnership with LinkedIn, aiming to facilitate decision making, and understanding of the labor market trends. The dataset was refreshed in annual basis and included data from more than 140 countries, with Greece being one of them (*Skills | LinkedIn Data*, 2020).

Yet another dataset of LinkedIn skills was discovered online, the difference was that this dataset consisted of information on job listings and the skills required by the employees over the last year. The file was quite large, listing 1.3 million jobs in equal rows, and it had 2 columns, one with the listing link and one with comma separated values of the relevant skills per listing. This made the data handling process quite challenging. Although the importance of comparing both the profile skills data mentioned before and the courses data with the information of real time market demands seemed important. The data are publicly available for download on Kaggle along with instructions and suggestions of how to use them by the author (Asaniczka, 2024).

Data Handling

Hereafter we are going to explain the way of handling the data in order to proceed with data visualization. Firstly, the LinkedIn skill dataset was stripped from the market section field and the previous year's rows, since the classification of the market was irrelevant for the purposes of this study and the skills were rated in an annual basis, so we needed the newest possible data. The final file consisted of 4 columns and 705 rows, featuring a unique id for each skill, the skills and the skill categories. Extensively, the skills were classified as Tech Skills, Business Skills, Soft Skills, Disruptive Tech Skills and Specialized Industry Skills. With the use of Gephi software the skills (nodes) were connected with the relevant types and were weighed by their rating, so that a network of skills was formed. Since some of the skills were mentioned more than once in the datasheet the duplicate nodes were removed manually in order to make the skills

network more readable (Foster et al., 2021). The purpose of using this dataset was to determine the qualities that people of trending professions had, in order to determine the skills demand and compare it to the courses offering. The final network and the relevant analysis of the findings will be listed along with the rest of the results.

In order to handle the job listings dataset, the first step was to open the file in Excel and use the data model manager to separate the values and clean any corrupted data of the fields. We have also separated the column of the listing in sub columns in order to have the actual profession without the raw URL information. The result was a file consisting of 1 million rows and 53 columns. Then a CSV file of the jobs listed was stored in CSV format, and analyzed with Orange Data Mining software in order to find the most prominent professions. The other part of the file consisting of the skills in demand was handled in a similar way. It was decided that a word cloud along with a topic modelling approach, was the suitable way to highlight the most popular skills. Both files were handled in a similar way, but in the process of topic modelling, repetition of information made the results irrelevant so it was made clear that the results would have no success in highlighting the trending categories in current labor market setting, thus were not taken into consideration in the overall research outcome.

Questionnaire

The last part of the methodological approach of this paper, consists of the description of the questionnaire used (see Appendix I), along with some elaboration on the conclusions we are hoping to make by analyzing the responses of the participants. After going through a selection of questionnaires on the same subject, and adapting them to serve the purposes of this research, a few more questions were added in order to elaborate things regarding the Greek status of the e-learning field.

Mostly the questions regarding digital literacy and digital readiness of the users were inspired from a survey conducted to English university students (Student Digital Experience Insights Survey 2022/23 UK Higher Education (HE) Survey Findings, 2023). Moreover, the questions regarding the benefits and drawbacks of online learning were taken by a study on the students' acceptance of the e-learning as an alternative to

traditional learning methods (Pozgaj & Knezevic, 2007). Finaly, most of the items in Likert scale questions came as an inspiration after online research and review of articles on e-learning readiness in combination with a book which included a readiness evaluation method (James-Springer & Cennamo, 2021). At this point we should repeat that the questionnaire was formed in Greek language with the use of Google Forms, and was distributed only through the internet.

As a part of the process an active link was created and sent to a large group of contacts via email. The same link was shared in both Facebook and LinkedIn, and it was also published in 8 Facebook groups that shared an interest in e-learning and available online courses. The estimation of the people that ultimately viewed the questionnaire is hard because although it was shared with several people it is unclear which of these groups' participants were active users. However, the sharing increased the randomization of the sample and contained the risk of biased sample (Bryman, 2016).

The questionnaire was self-administered, with an estimated duration of 8-12 minutes depending on the participant's replies. The participation in the survey was anonymous. An introduction was made stating the purpose of the survey and the contact details of the researcher, along with instructions to ease completion and a consent note (Wimmer & Dominick, 2011).

In the first section of the survey the respondents were asked to complete a few demographic details regarding their age, gender, educational level, and employment status. All of the above questions were closed type, although for the gender question there was an option for the participants to self-describe themselves. The age question had answers that consisted of age groups of ten years range up to 54 years and an open category for older people. The purpose was to be able to focus on the actively employed adults and make categorized results easier to analyze.

Following that, a Likert scale question consisting of 8 items with a 5-scale range from No to Yes was utilized in order to determine the general perceptions of the respondents and their attitude towards e-learning as a process. All Likert scale questions used in this survey were designed in a 5-scale range in order to cover all opinions and

also provide a mediocre stance option represented by the middle number (3) (Bryman, 2016). The questions that came right after were multiple choice questions, with a maximum total of 3 answers accepted per question, regarding the perceptions on benefits and drawbacks of online courses. Then a screening question asking whether the participant had ever taken part in an online course followed. Those that answered negatively were required to answer one more screening question, exploring their willingness to participate in such courses in the future. For those giving a negative response to that question the survey was terminated, since their participation would have little to add in the findings of this study.

For those who replied positively a set of closed type questions regarding the exploration of the aspects around the intention of participation followed, the last question of this part of the questionnaire was an open type question requiring from the respondent to state his expectations from a presumed participation in e-learning courses. The aim was to determine what are the needs of potential students behind an e-learning experience, the results of a relevant question to those who have already participated can provide an indication on the relevant research question about satisfaction of the learners' needs by the use of e-learning.

The participants who had already taken part in an online course were navigated to a similar section, but were asked about their experience on participating. By this set of questions, we will be able to find out more about the type of skills acquired by the participants which we will then be able to compare with the relevant skills data analysis performed on the datasets mentioned in the previous pages. Another question indicating the user satisfaction upon completion of the course was the one that explored the intentions of re-enrolling in a similar program in the future.

Furthermore, there is a closed type question aiming to give us the results on the effects of Covid in participation of users in online learning solutions, which was part of the stated research questions, followed by some more closed type questions regarding the employer behavior towards the participant prior and after the completion of the course, in order to test another one of our original assumptions.

Generally, closed type questions dominated the biggest part of the questionnaire, the reasons behind that were mostly making it easier for the user to complete, while at the same time minimizing user inflicted errors that would render the whole response unusable or would make the analysis of the findings harder (Wimmer & Dominick, 2011).

Another Likert scale, measuring the degree of satisfaction on several aspects of the e-learning experience, the provided services and materials, was required. Overall, answers obtained by this question could prove rather significant, since apart from providing a direct answer to one of the basic research questions, it can also provide us with some insight on satisfaction over specific features of online learning.

The following part of the survey was addressed to both categories of respondents, it featured 3 sets of Likert questions, aiming to answer the research questions regarding digital readiness, psychological readiness and commitment of the user in the educational process.

The last part was a set of 5 closed type questions regarding infrastructure and technology readiness that required from the user to list the available equipment and the quality of his/her network access, in order to answer yet another readiness research question.

As an observation, the findings of this survey can lead us not only to find the answers that were sought for from the beginning of this study, but it has the potential to also uncover even more relevant information that could be used as insights or indications for further study on the subject.

Chapter 5: Analyzing the Results

Questionnaire results

Since we have stated the research questions, which came up while examining the literature on e-learning, communication and readiness, and we have declared the methodology associated with the research steps, we are going to present the results of each step, starting with the survey.

The online questionnaire described above was open for a 10-day period in June 2024. The total number of respondents reached 106 people, of which 41.5% were men and 56.6% were women. The remaining 1.9% refused to disclose their gender. The demographics show a close difference with the general population of Greece, according to the results of the latest census (ELSTAT, 2023), thus validating the formation of the sample regarding the allocation of the gender. It also bears a relevant homogeneity regarding the age distribution (Bryman, 2016). Especially considering that the survey mainly concerns the active workforce in Greece, there is a slightly highest concentration between the age groups of 35-44 and 45-54 years old (ELSTAT, 2023).

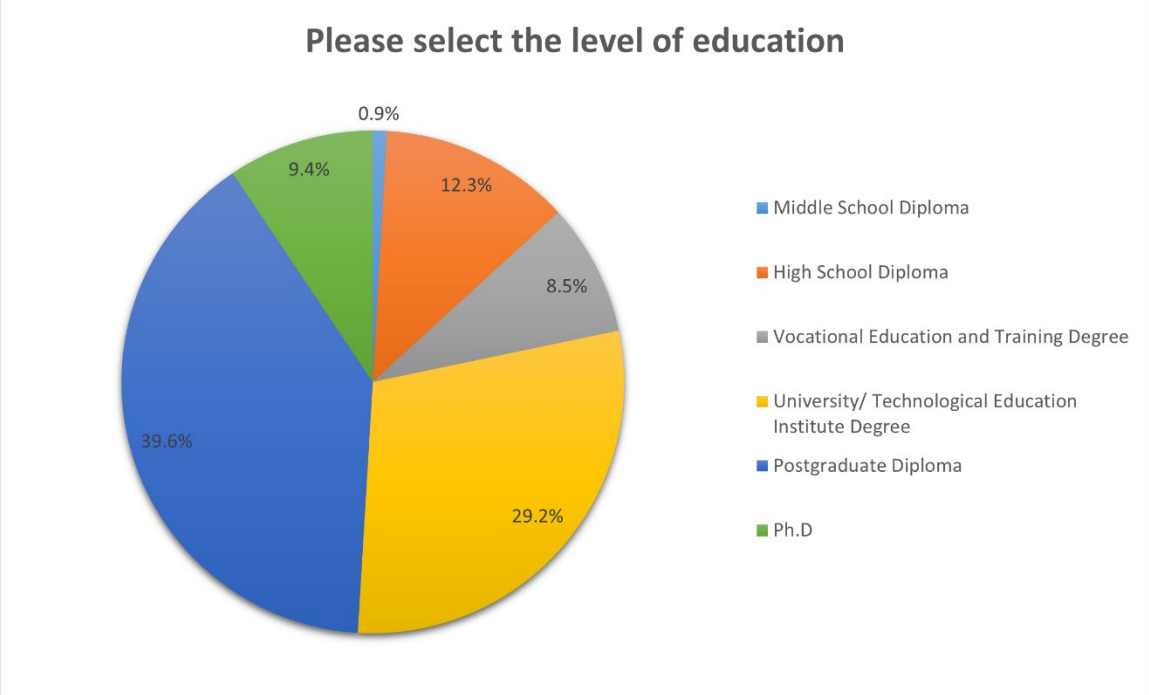

Chart 1: Level of Education

Specifically, 47.2% of the sample was between 35-44 years old, 31.1% was between 45-54 years old, 10.4% was 25-34 years old, while the remaining two age groups had less than 10% each.

Regarding the level of education, which along with the rest of the demographics are factors that must be considered in order to answer the first research question about the role of demographics in the ability of completion and general opinion of the e-learner, we notice that the vast majority of the respondents are of high educational level as shown in the chart below.

In terms of employment status, 49.1% work full time in the private sector, 23.6% are civil servants and 15.1% are self-employed. the rest of the results on employment can be viewed in Appendix II.

In the question regarding the general perception about e-learning courses, we scaled the answers according to the Likert scale method and then aggregated them, an average of all answers was also calculated in order to understand whether the learners have a positive or a negative opinion for e-learning in general (Bryman, 2016). The results showed a high value of recognition towards e-learning with an average of 3.66. It was interesting though that the item with the lowest score (2.34), hence the greatest disagreement, was the item stating that online learning courses can replace the live courses, while most of the respondents consider that e-learning can operate as a supplement to the live classroom (4.31).

With all the demographics declared, along with the opinions stated above we are now able to answer (RQ1B) regarding the role of demographics in shaping opinions about e-learning. Women and men seem to be equally positive regarding e-learning, with an overall score of 3.96 for women and 4.01 for men. Examining opinions of each age group we did not find any noticeable change with a score ranging between 3.75 and 3.86, we cannot confirm that age is a factor influencing opinions. Similar were the findings regarding the employment status. The RQ parameters are not met by the educational level either, with a range of positiveness between 3.96 and 4.01 per group.

So, according to the findings, demographics do not influence the opinion of a person towards e-learning.

The following two questions were aimed to show whether the Greek learners can identify the advantages and disadvantages of e-learning courses. When it came to the advantages, the first one recognized, with a percentage of 78.3% (83 responses), was the fact that one can attend online courses from everywhere since they remove the place limitations. Second was the flexibility to attend whenever convenient, with 56.6% (60 responses), while third was the ability to access the material and summarize whenever necessary, with 51.9% (55 responses). So, the two main advantages of MOOC courses as they were described in literature review, are confirmed by the survey.

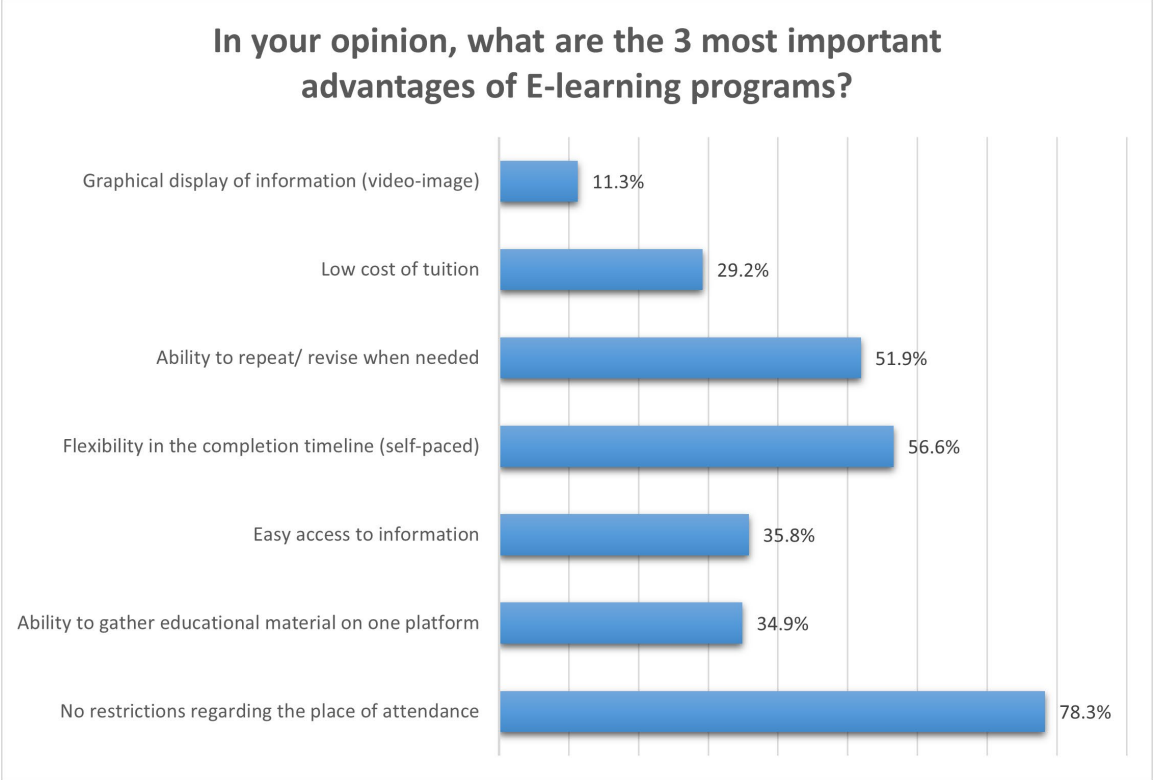

Chart 2: Advantages of e-learning

Regarding the disadvantages, the biggest perceived by the respondents is the lack of communication with co-learners, with 73.6% (78 responses), but in a close difference, of just one answer, with the lack of communication with the instructors, while lack of interaction comes third with 60.4% (64 responses). Viewing the results can only confirm the importance of communication in the online educational domain, since

as we have now mentioned multiple times, the value of community and the trust to the instructor seem to be irreplaceable.

With the first indications in mind, we will now see the rate of attendance of our sample in online learning courses. Out of 106 people 91 has attended an online course at least once, this is the 85.8% the sample, from the remaining 15 people, 13 replied positively in the next question about intention to participate in e-learning courses. The fact that from a sample of 106 people only 2 were unwilling to participate in e-learning courses, is already giving a hint that some conclusions regarding learners readiness might be safe to draw, but this is something that we will validate over the next questions. (see Appendix II)

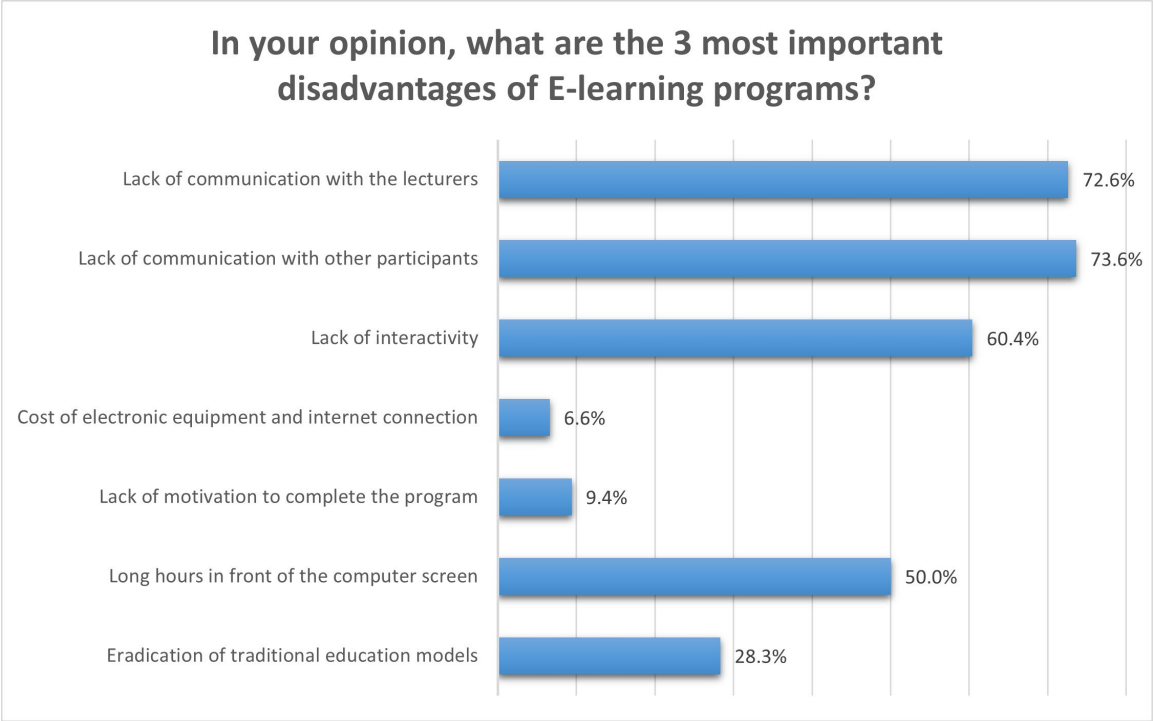

Chart 3: Disadvantages of e-learning

In terms of intentions, those respondents who have not attended a program replied in a question on what field of study they would choose to attend. The first choices, shorted by percentage, were in the following fields of study: Entrepreneurship & Business skills (30.8%) , Technology & Computer Science (23.1%) and Business &

Administration along with Foreign Languages had 15.4% each. We are going to furtherly utilize these results by comparing them, later on, to the trending skills data analysis.

The expected outcome of the learning process for over half (61.54%) of the people who have not yet attended an online course, is to gain knowledge and experience. Since this was an open question the rest of the answers were so varied that no other conclusion could be made.

From now on we are going to concentrate on the experience of the people that participated in an e-learning course (91). The results here are slightly different than the intentions we viewed before. While really close in numbers the field with the most participants is Finance & Management, with 26%, following we have Social Sciences & Humanities and then Technology & Computer Science. The exact percentages can be viewed in the following chart.

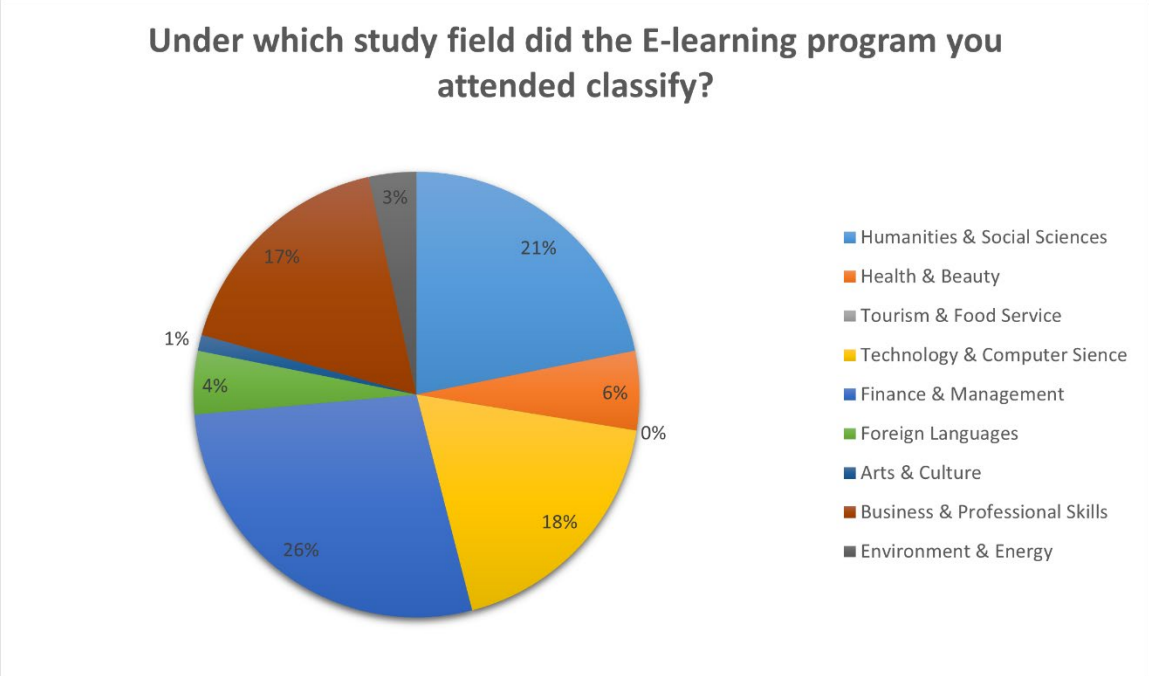

Chart 4: Participants per field of study

The next result names the institutions that the participants have selected for their course. This information is to be used in comparison with some other elements of the data analysis. But indicatively we can say that the e-learning department of Hellenic University of Athens had the most participants (26) and following the Coursera MOOC

platform with slightly less participants (19). All other institutions can be found in the relevant chart in Appendix II.

Following, the question regarding the cost of the e-learning courses will show whether the Greek institutions offer enough MOOCs as opposed to paid SPOCs. Also, we will be able to see if there is financial support by the employers and organizations. More than half of the participants have not paid for their course. Specifically, 34.1% attended a MOOC free of charge, 7.7% stated that their employee covered the cost and 9.9% (see Appendix II) that the cost was covered by public institutions. Financial support from the public institutions and the employers, while not ample, is present, while the percentage of the MOOCs is considered adequate. At this point we should elaborate that the percentage of the MOOCs is dependent on the choices that the participants made and it does not necessarily present the general offer by the institutions.

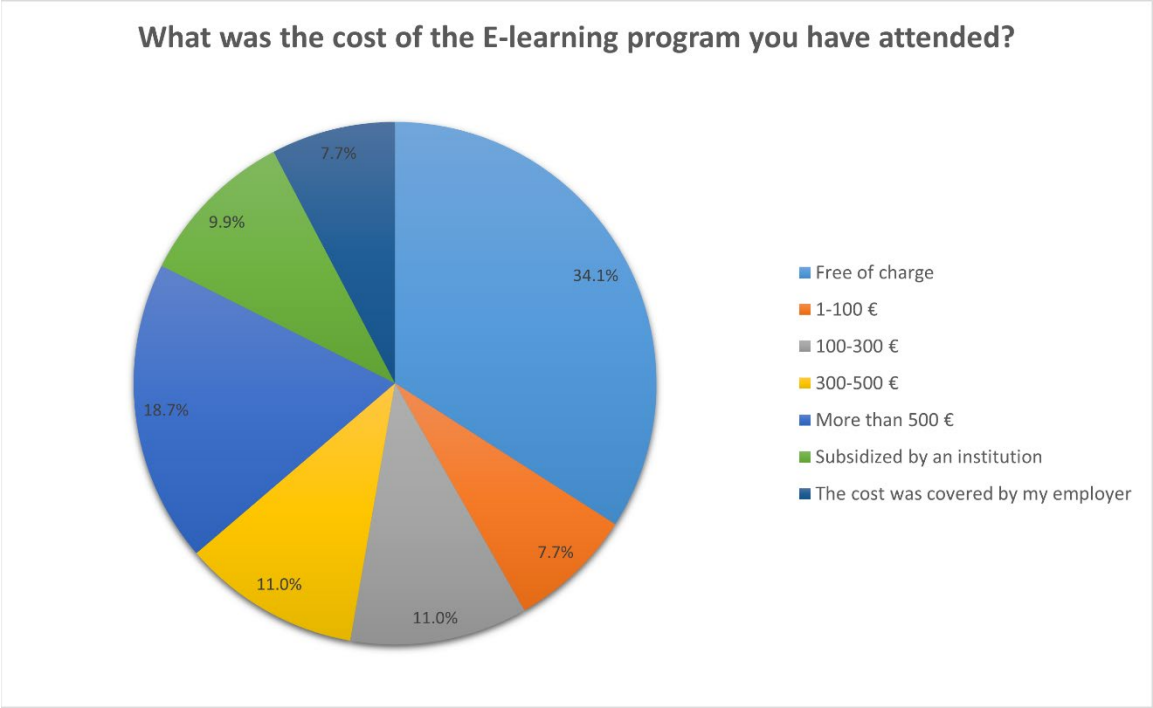

Chart 5: Cost of e-learning courses

But what happens when it comes to certification, which apart from being one of the reasons to attend a course, it can also be considered as the satisfaction of one's need to educate and self-improve, although we cannot validate (H2) regarding satisfaction levels solely dependent to this question, we can try to answer (RQ1)

regarding the demographic's role upon completion of a program. As the following chart indicates, from 91 people only 5 did not complete the course, and they were men and women of various ages, employment status and educational level. So, we suggest that demographics are irrelevant with the rate of completion of e-learning programs.

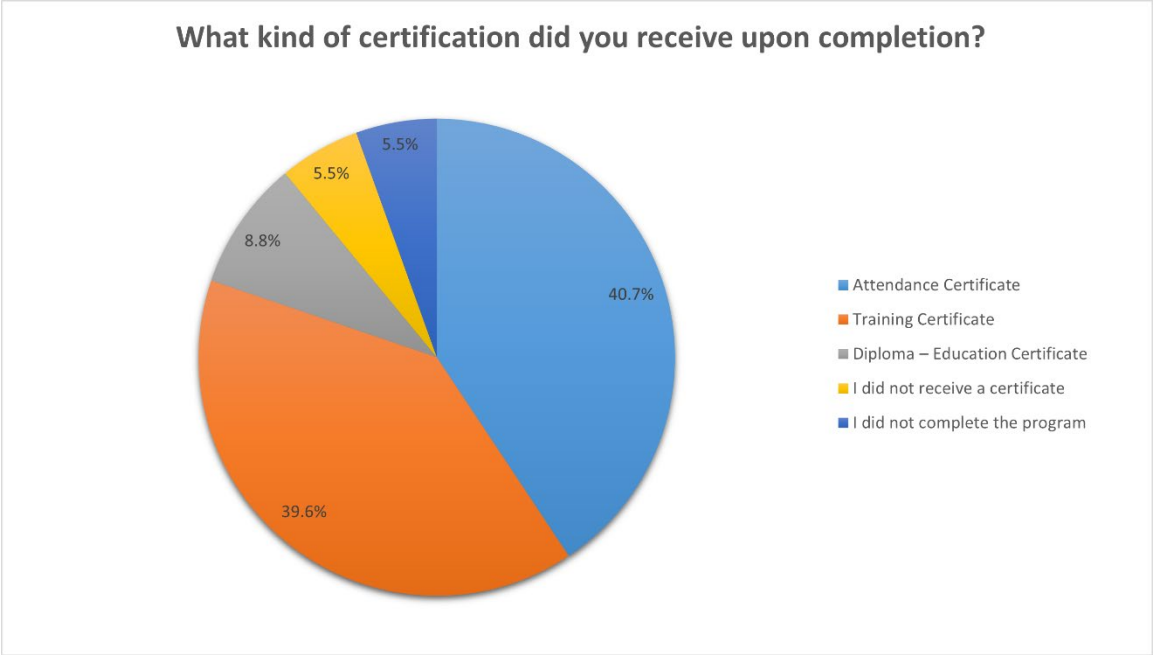

Chart 6: Type of Certification

Moreover, most of the participants have stated that they would enroll again for a similar e-learning course on the same (31.9%) or a different field of study (28.6%), another (36.3%) stated that they may participate again while only 3 people said that they are not willing to enroll again. From the fact that most respondents would participate again, we can infer that they are overall satisfied by the online learning experience.

The next question is the one expected to give us results in order to validate our hypothesis of the effect that the Covid-19 pandemic had on participation in online courses. The percentage of people having participated in e-learning courses prior Covid-19 was 22%, another 7.7% has enrolled prior Covid-19 and completed the course during the pandemic. For these categories Covid-19 had no effect on their decision to participate. The rest of the respondents stated that they had enrolled and completed the courses either during or post pandemic. The exact numbers are shown on the

relevant chart below. By looking into the numbers, we can see that Covid-19 has actually increased the number of participants both during and in the post pandemic era. So, our (H3) hypothesis is confirmed.

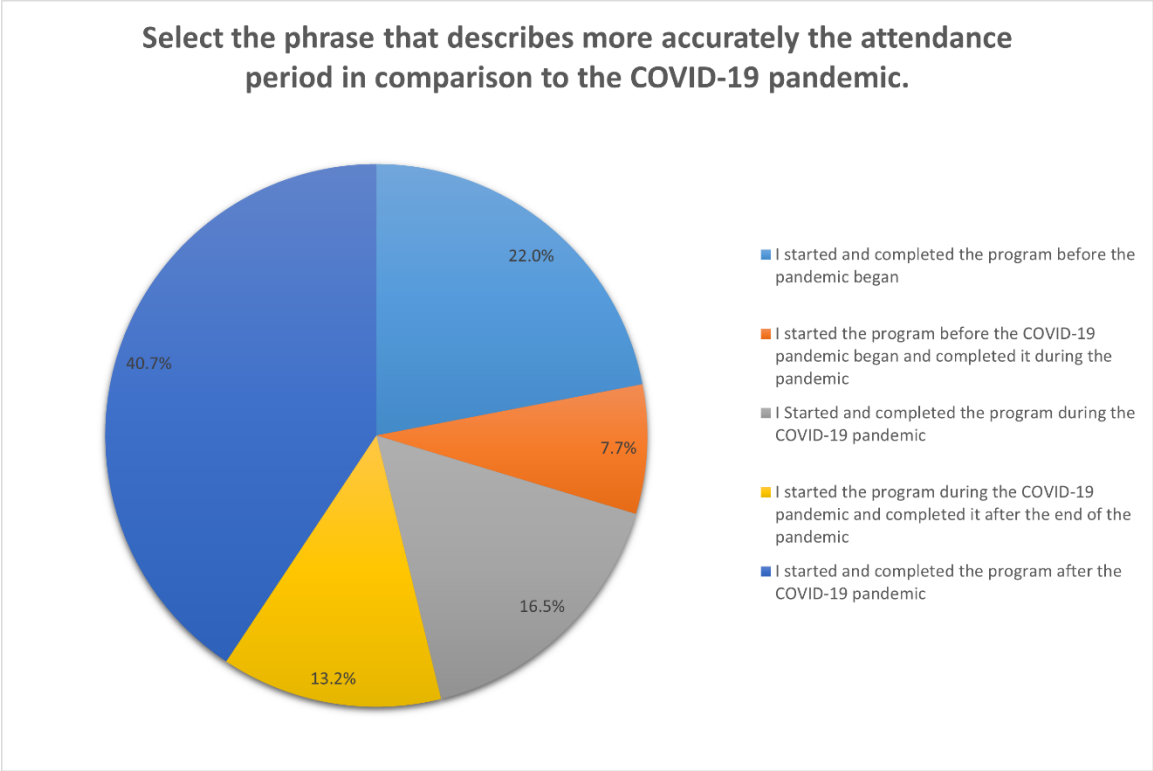

Chart 7: Attendance as opposed to Covid-19

The following three questions are aiming to confirm our hypothesis assuming that (H1) completion of an e-learning course leads to a positive career change, be that a raise, a promotion or any other rewarding career outcome. Most of the respondents were full time employees during their attendance (62.6%). Another 9.9% were unemployed, and 9.9% were freelancers, the remaining 17.6% were a mix of part time workers, in suspension due to Covid-19 or working from home (see Appendix II). Some of the respondents received some kind of help from their employers while attending the course, apart from 25.3% that claimed not having a dependent working status. A neutral stance was held by 35,2% of employers, while 19.8% were nominated by the company to attend, and 9.9% were subsidized in order to attend. The remaining 9.9% got a paid leave in order to attend. But when it comes into benefits or recognition upon completion the answers are completely different. The vast majority of respondents

84.6% said that nothing had changed in their working condition upon completion of the course, and only 15.4% has received some kind of reward. So, our (H1) hypothesis, that assumed a positive carrier change upon completion is not confirmed.

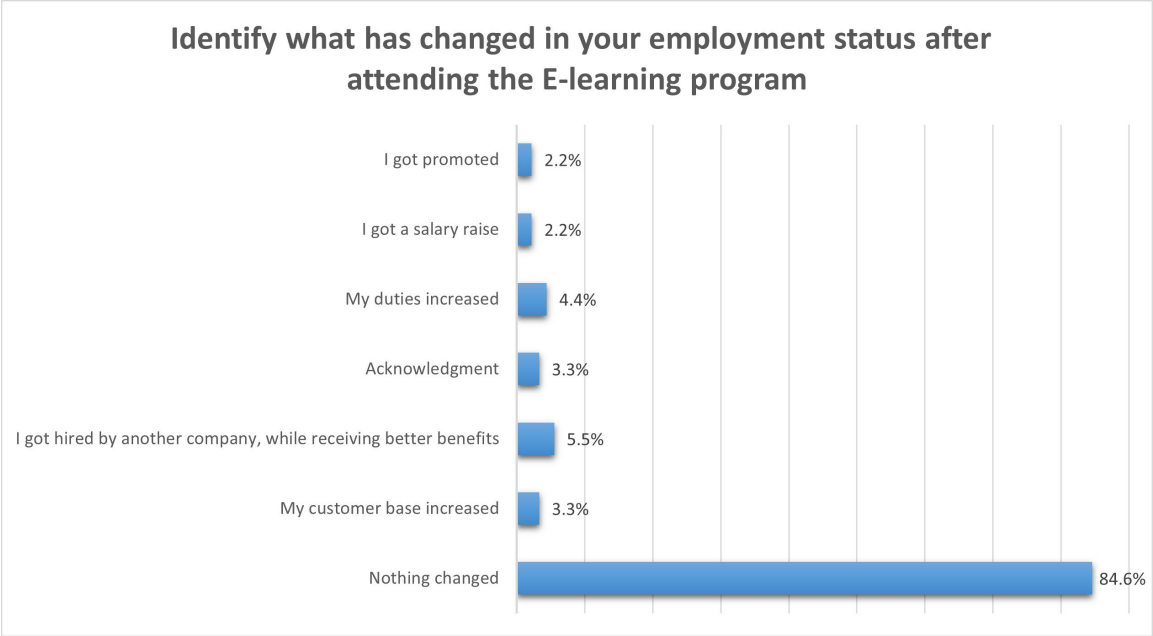

Chart 8: Post attending employment status

Proceeding to the next group of questions, we are seeking to confirm the communicative research question about efficiency in communication throughout the course and satisfaction of the users' needs. So, first of all we should confirm whether the participants made use of the provided means to interact and communicate within the course. The relevant chart shows a satisfactory percentage of participation in online classrooms (60.4%) and other transactional processes of the courses, while most of the participants achieved access to online learning material (74.7%), direct conversation with the instructor held a slightly decreased percentage of 36.3%.

The level of satisfaction was to be determined by a Likert scale with the method of the average of all items, as we did in a previous question of the same type. The result showed a 3.6 level of satisfaction which means that the participants were somewhat satisfied by the overall procedure, also in the questions that followed regarding the overall satisfaction for the acquired level of knowledge the level of satisfaction is slightly

increased in 3.66, and in the specific choice of course question , participants stated that they are even more satisfied with a 3.67 average of answers.

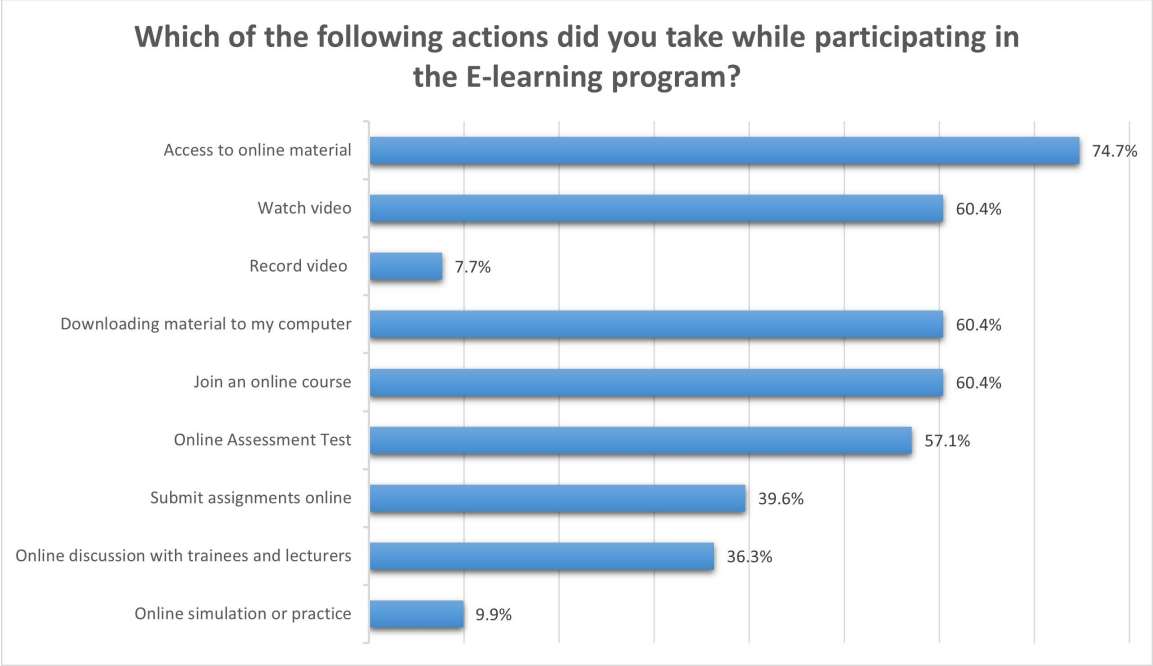

Chart 9: Actions taken during participation in a course

The only concern raises when looking specifically at the question regarding the ability to communicate with fellow learners. The level of satisfaction was the lowest of the set with an average of 2.97. However, the lack of communication does not seem to tamper with the overall completion rate. In this context, the research question (RQ2) regarding the effectiveness of communication with fellow students, is negatively answered, since the learners had given a low score in that specific question. When we address the communication of learners with the instructor though we find that the learners have a satisfactory level of communication. Regarding (RQ2a), as previously stated, there is no pattern signifying that lack of direct communication affects the learning outcome.

Lastly, in (H2) we assumed that there might be a connection between the learner's completion of an online course and their perceived level of satisfaction according to their needs. With an above average score in the scale of satisfaction on both the learning process and the acquired knowledge, we suggest that upon

completion the need of the participant for access to information and education is adequately fulfilled which is also confirmed by the fact that most of the learners would repeat the same learning process, as stated in a previous question. So, the hypothesis (H2) seems valid.

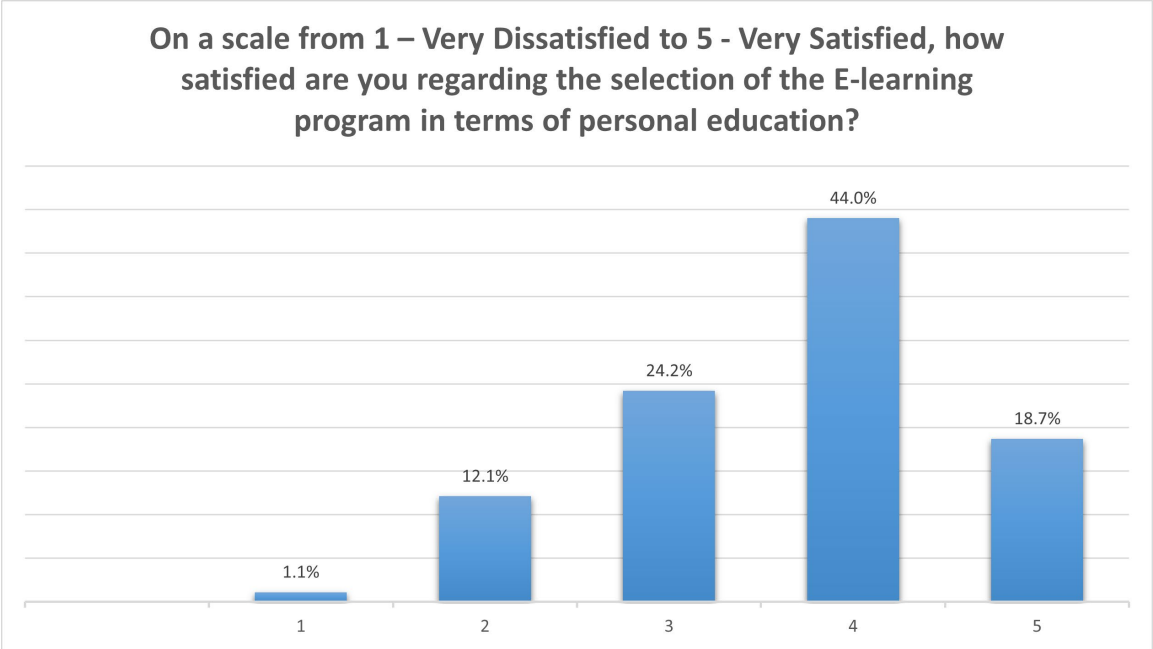

Chart 10: Satisfaction upon completion of the course

Last but not least the following set of questions is planned to answer our research questions on the estimation of readiness. The first set of Likert items refers to the digital readiness of the learner. An average will be once again calculated for the whole set in order to answer our (RQ3a) of whether the online learners in Greece have the required level of digital readiness. The overall score on digital readiness is really satisfying with an average of 4.56, while in none of the items the average has dropped below 4, this signifies that the learners are digital ready to involve themselves in an e-learning course.

In research question (RQ3c) we are seeking both psychological and motivational readiness, the first will be answered by a set of questions regarding willingness of the user to participate and self-regulate. The results of this set of items showed a level of readiness of 3.95, which is quite satisfactory. As a result, we can observe a good level of

psychological readiness. What now remains is to examine the levels of motivational readiness which means the effect of commitment, self-regulation and self-efficacy.

In terms of motivation we have calculated similar results, with 3.97 out of 5, efficacy level to set and maintain focus on their goals, Greek learners seem to be both psychologically and motivationally ready.

The last set of questions is going to address the digital readiness in terms of equipment and infrastructure. In terms of availability of equipment all users seem to have access to more than one of the required devices, although they seem unwilling to use mobile devices when it comes to e-learning (see Appendix II), so by looking at the numbers along with the charts we see that more than half have access to a desktop computer, almost all have access to a laptop and a smartphone and the majority possesses the relevant equipment to participate in video chats and online classrooms.

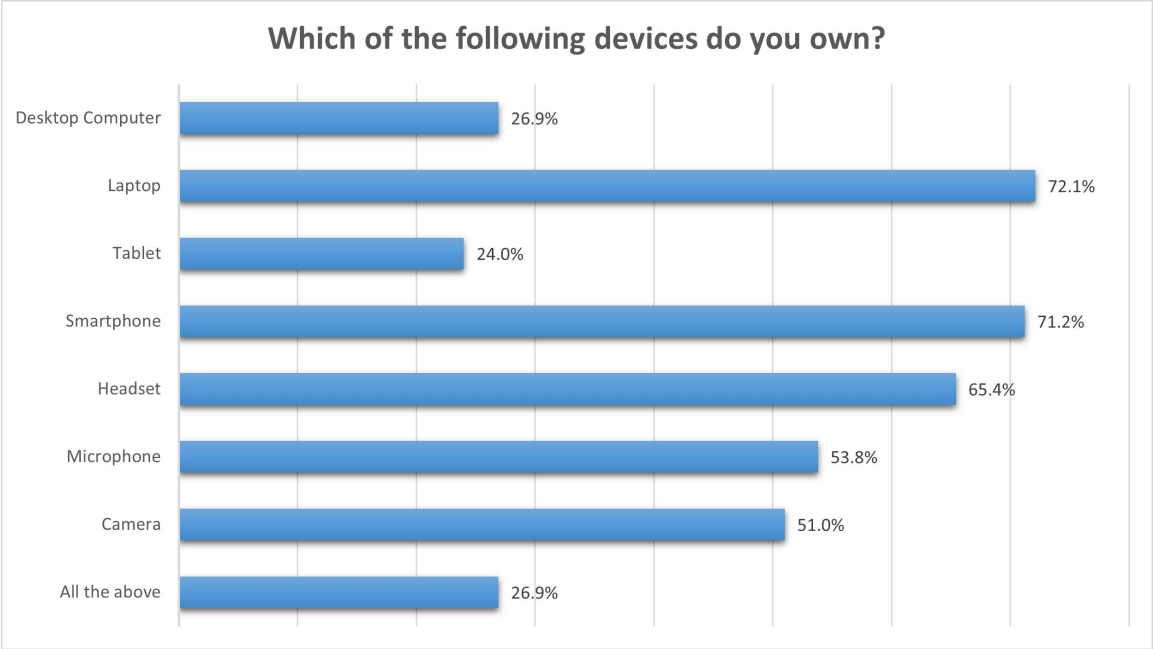

Chart 11: Devices owned by learners

While access to relevant equipment seems adequate, in the next question we see that the participants are equally divided between those that have updated equipment (less than 5 years old) while the others rely on older devices that may pose an obstacle when it comes to attending an online course (see Appendix II).

To conclude, the internet access of the users is assessed in the last two questions. In regard with speed of connection, almost half of the users access an internet connection between 51 and 200 mbps which is considered adequate in terms of e-learning, 16.3% did not know the details of their connection while 22.2% had an internet connection between 25-50 mbps and the remaining 13.5% an internet connection lower than 24 mbps (see Appendix II). While these results were expected since not all people in Greece have access to optical fiber networks yet. In terms of network efficiency, most users seem to be satisfied with the stability and overall effectiveness of the network as one may notice in the chart below. As a conclusion, overall digital infrastructure readiness is considered to be in high levels, which in combination with the Likert scale answers on digital literacy led to the conclusion, in regards to (RQ3a), that learners are actually ready to adopt in educational procedures involving e-learning.

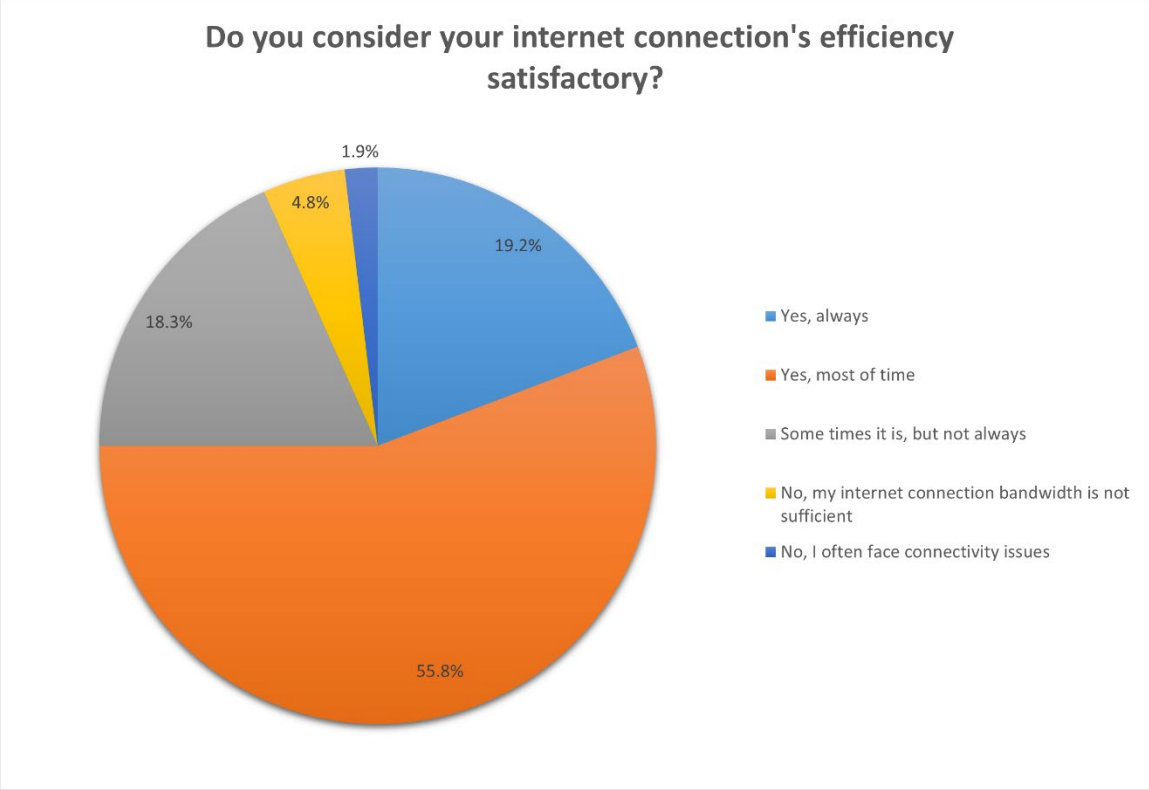

Chart 12: Effectiveness of learners' internet connection

Data Analysis

Following the analysis of the questionnaire, we are going to examine the results of data handling, performed on the datasheets described in the methodological part of this study. The first set of data concerned the skill penetration into the job market, practically these are data of personal profiles that are already working within a given field. The selected data concerned year 2019 and, using Gephi, a network of skills was created, connected with the relevant skill categories as given within the Word Bank Group datasheet analyzed by Zhu et al. (2018).

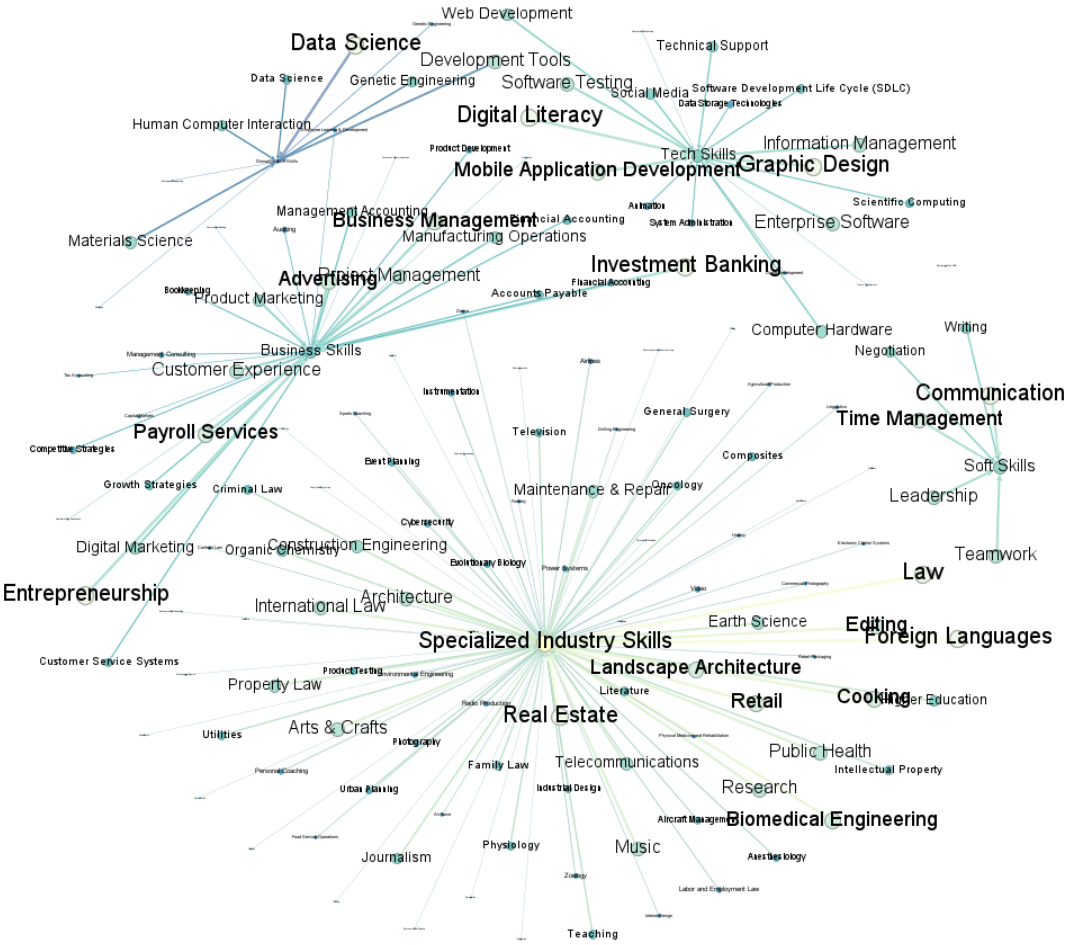

Chart 13: Network of skill per category.

To furtherly discuss that, what we see are 5 main categories (Specialized Industry Skills, Soft Skills, Business Skills, Tech Skills and Disruptive Tech Skills). The skills that most employed people have are the ones that appear bigger. We can easily discern Real Estate, Data Science, Digital Literacy, Graphic Design and Business management among others. Practically this means that everyone who has skills relevant to these might have a better chance to employment.

Since we have now seen the skills that are already within the labor market, we should go on with some skills that are in high demand. The second dataset consists of information from over 1 million job listings posted during 2023 on LinkedIn. The skills and the jobs column were separately imported in Orange Data Mining Software and two different world clouds, with the 200 mostly demanded skills along with 200 most posted jobs, were formed. Firstly, the skills cloud will be presented in order to see any possible shifts from the professions in occupation to those in demand.

Chart 14: Skills in High Demand Cloud

We can observe now that the demand requires skills in communication, leadership, nursing, and there is a general trend for managerial jobs, if this is the case then through that observation we would expect to see similar available courses in the courses dataset created by the data collected from Greek online courses providers.

But prior to that we should see the relevant jobs from that skillset. In order to have a clearer view of what the offering should be.

Chart 15: Word Cloud of Jobs in high Demand.

It seems like no surprise that the jobs are clearly relevant to the skills from the previous world cloud, actually, with a closer look, one will also find similarities between those and the first dataset, with highly required skills. such as leadership in order to fill managerial positions that are in high demand. Data science and science and medical professions along with communicational skills and hospitallity professions such as restaurant manager, kitchen manager e.tc. are other easily observed examples.

Now, in order for all these to have a meaning, we need to take a look to the available topics of courses in Greece, thus from the dataset created from greek institutions websites we have created one network in Gephi connecting all available

courses per filed and a word cloud based on the translated description of each course. First we should see the network in order to decide if the available courses are relevant with the demand in skills.

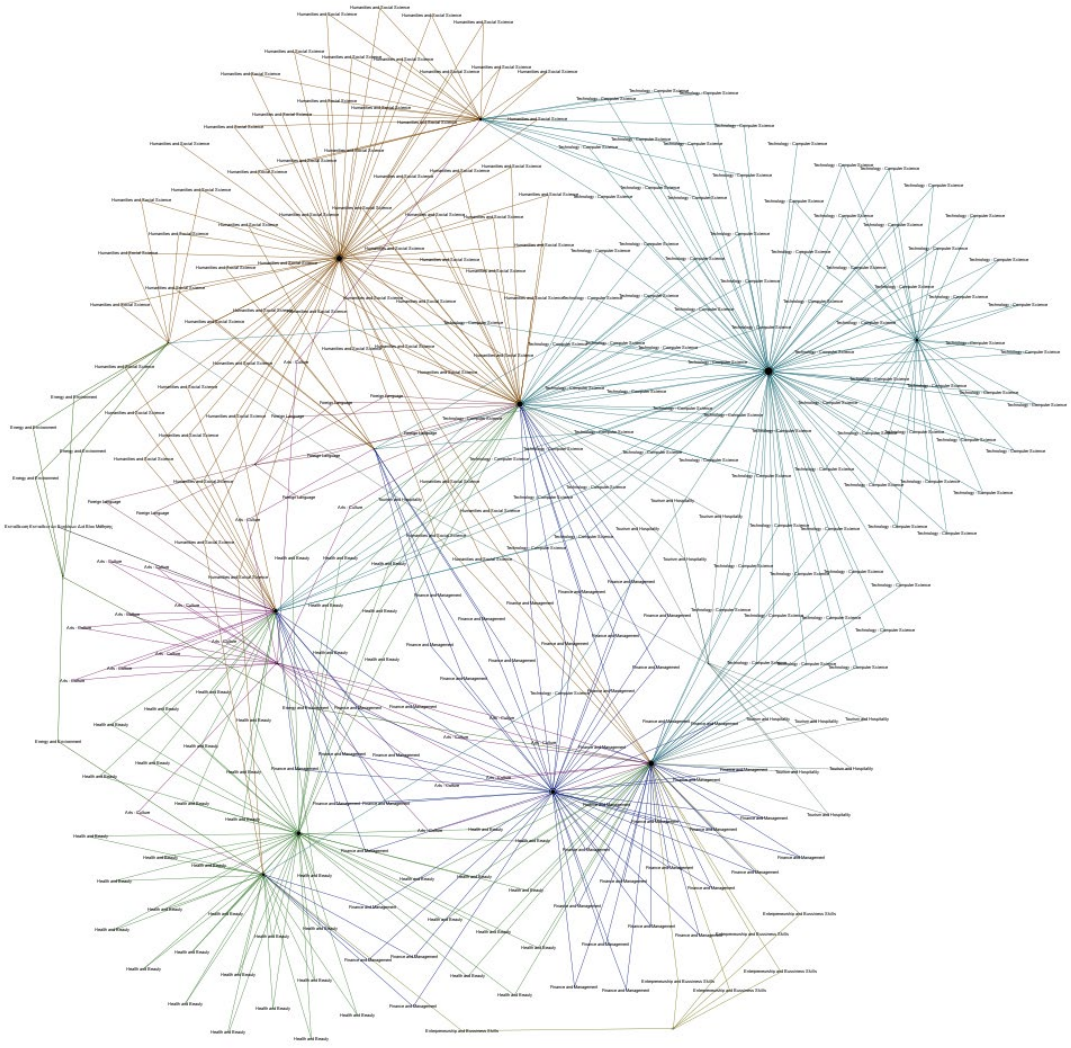

Chart 16: Greek courses per field of study

Although difficult to highlight in this size of the chart, there are quite many technology-oriented courses coded with light blue in the right top of the graph. Social science is close, highlighted in orange color, and those with darker blue are courses on Finnance. By taking a closer look you will notice that in between we have environmental

and health courses. So, actually Greek institutions seem to manage to provide courses relevant to the high demand fields according to the skillsets.

Ultimately, the word cloud of Greek courses descriptions is going to be presented to see how it compares with the rest of the datasets.

Chart 17: Greek courses description cloud

Other than the prominent words, regarding the educational process, such as purpose, program and education, we can clearly recognize two of the most prominent fields of the skillsets, the data science and the management. Of course, there are also words that show a prevalence of the technology-oriented courses.

By looking into the Greek courses graphs we can imply that there are enough and variant courses offered to the learner, thus regarding the (RQ3d) asking whether there are adequate and relevant to the evolving market courses in the Greek e-learning scene, we are likely to confirm content readiness. Finally, with all factors of readiness

covered adequately, the main research question (RQ3) of the group, regarding overall readiness of the Greek learner to participate in online courses, can be addressed. Considering the whole range of findings, we suggest that the factors of e-learning readiness are met, thus Greek learners are not only ready to participate but also probably are set to achieve, every time they choose to access a course.

Conclusion – Discussion

While the research questions have been answered, there are a few things to be furtherly taken in to account in order to enhance our ability to communicate knowledge effectively. The purpose of this paper was to explore the communicative field around adult education.

Under that scope the research has focused mainly on the communicative aspect and the e-learning readiness literature because it promotes the mentality to improve the challenging parts of the learning community. While studying on the factors of influence on the readiness, there were some interesting aspects such as the Covid-19 pandemic that amplified the need to improve e-learning readiness(Maatuk et al., 2022), so it is only suggested that policy makers should take advantage of the momentum that the pandemic has created, in order to improve the infrastructure to facilitate the communicative aspect of e-learning.

Moreover, according to the data collected and analyzed above, we determined that the Greek learners have the right mindset and motivation in order to achieve, even in self-paced MOOC courses, where the levels of self-efficacy have to be high in order to succeed (Kaplan & Haenlein, 2016). However, the lack of direct communication seemed to bother the learners, even if, as it seems, it does not affect the educative outcome. So, maybe the designers of the e-learning products should try harder to make the communicative solutions of their courses more compelling and easier to use, in order to improve both efficiency and the level of satisfaction of the adult learner(Pappas et al., 2019).

Furthermore, in a constantly evolving technology setting, we have managed to confirm the presence of digital literacy and equipment readiness of Greek learners, although a probably problematic area was discovered in the process. While having the necessary equipment for mobile learning, which is constantly a hype along with social learning, Greek learners seemed to be unwilling to use mobile devices for educational purposes. They also seem to lack willingness to use the social media for meaningful communication in a learning environment (Garrison, 2017).

As our research indicated the most problematic domain of communication within e-learning environments, was communication with fellow learners, since the sense of community is a valuable asset in constructing knowledge and creating an effective interaction and collaboration between the learners. So, a relevant suggestion is to take advantage of the mediating effect of instructor in an online classroom setting, even for some parts of the courses in order to give the opportunity to the participants to connect with each other (Duan et al., 2024).

Furthermore, since the learners are required to constantly self- educate to improve their skills in such a competitive work setting, they should be at least facilitated by the employers for adding value not only to themselves but to the employing companies as well. Also, some form of recognition should be provided upon completion in order to pertain the levels of motivation (Holmes & Gardner, 2006).

Another observation is that the advantages of e-learning courses, lifting the time and space limitations, combined with the demanding living conditions of the adult learners, indicate that the necessity and demand for effective e-learning solutions will remain high or even increase in the future. Considering that, all efforts must be focused in facilitating the process and creating meaningful learners' experience in all aspects. This signifies an era when institutional and state readiness will have to live up to the expectations of the learners.

Regarding the offered courses, even with the limitations that this research had in accessing relevant data from the institution, it has been made clear that the e-learning market in Greece is booming and busting with all kinds of programs in every field of study. Another observation is that the learners are also willing to attend courses in languages other than Greek. An upcoming challenge for the institutions will be to find a way to self-improve in order to achieve in keeping the attention of the learners and staying up to date with the competitive global e-learning market.

To sum up, it seems fit to highlight the importance of data science in elaborating massive shifts within the e-learning platforms, the users' actions and interactions with others, along with their achievements. All the above could provide insights on future

needs or expectations, so institutions should try to facilitate future research on users' perception and experience by providing the necessary data and encourage further research on the e-learning domain.

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Appendix I

Δημογραφικά Στοιχεία

Παρακαλώ επιλέξτε την ηλικιακή σας ομάδα *

- ◯ 18-24
- ◯ 25-34
- ◯ 35-44
- ◯ 45-54
- ◯ 55 και άνω

Παρακαλώ επιλέξτε το φύλο σας *

- ◯ Άνδρας
- ◯ Γυναίκα
- ◯ Δεν επιθυμώ να απαντήσω
- ◯ Άλλο: _____

Παρακαλώ επιλέξτε το επίπεδο εκπαίδευσης που αντιστοιχεί στον τίτλο σπουδών σας *

- ◯ Απολυτήριο Γυμνασίου
- ◯ Απολυτήριο Λυκείου
- ◯ Πτυχίο ΙΕΚ
- ◯ Πτυχίο Πανεπιστημίου - ΤΕΙ
- ◯ Μεταπτυχιακό Δίπλωμα
- ◯ Διδακτορικό

Πως θα περιγράφατε την εργασιακή σας κατάσταση; *

- ◯ Εργαζόμενος μερικής απασχόλησης
- ◯ Εργαζόμενος πλήρους απασχόλησης
- ◯ Δημόσιος Υπάλληλος
- ◯ Ελεύθερος-η Επαγγελματίας
- ◯ Συνταξιούχος
- ◯ Φοιτητής
- ◯ Άνεργος

Θεωρείτε ότι τα διαδικτυακά προγράμματα εκπαίδευσης: *

	Οχι	Μάλλον Όχι	Ούτε ναι ούτε όχι	Μάλλον Ναι	Ναι
Μπορούν να ικανοποιήσουν την ανάγκη σας για επιμόρφωση	○	○	○	○	○
Είναι ισάξια με τα δια ζώσης προγράμματα σπουδών	○	○	○	○	○
Μπορούν να σας βοηθήσουν να επιτύχετε τους επαγγελματικούς σας στόχους	○	○	○	○	○
Προσφέρουν μια πρώτη εικόνα του γνωστικού αντικειμένου	○	○	○	○	○
Μπορούν να αντικαταστήσουν την δια ζώσης εκπαίδευση	○	○	○	○	○
Προσφέρουν ολοκληρωμένη εκπαίδευση σε σχέση με το γνωστικό αντικείμενο	○	○	○	○	○
Αποτελούν επαρκή απόδειξη γνώσης	○	○	○	○	○
Μπορούν να λειτουργήσουν ως συμπλήρωμα των δια ζώσης προγραμμάτων	○	○	○	○	○

Ποια θεωρείτε ότι είναι τα 3 σημαντικότερα πλεονεκτήματα των διαδικτυακών εκπαιδευτικών προγραμμάτων; *

- [ ] Δεν υπάρχουν περιορισμοί στον χώρο παρακολούθησης
- [ ] Συγκέντρωση εκπαιδευτικού υλικού σε μια πλατφόρμα
- [ ] Εύκολη πρόσβαση στην πληροφορία
- [ ] Ευελιξία στο χρονοδιάγραμμα ολοκλήρωσης
- [ ] Δυνατότητα επανάληψης όταν χρειάζεται
- [ ] Χαμηλό κόστος φοίτησης
- [ ] Γραφική απεικόνιση της πληροφορίας (βίντεο-εικόνα)

Ποια θεωρείτε ότι είναι τα 3 σημαντικότερα μειονεκτήματα των διαδικτυακών εκπαιδευτικών προγραμμάτων; *

- [ ] Έλλειψη επικοινωνίας με τους εισηγητές
- [ ] Έλλειψη επικοινωνίας με τους άλλους εκπαιδευόμενους
- [ ] Έλλειψη διαδραστικότητας
- [ ] Κόστος ηλεκτρονικού εξοπλισμού και σύνδεσης στο διαδίκτυο
- [ ] Έλλειψη κινήτρου ολοκλήρωσης
- [ ] Πολλές ώρες μπροστά στον υπολογιστή
- [ ] Εξάλειψη παραδοσιακού μοντέλου εκπαίδευσης

Έχετε παρακολουθήσει ποτέ κάποιο διαδικτυακό εκπαιδευτικό πρόγραμμα; *

- ◯ Ναι
- ◯ Όχι

Πληροφορίες σχετικά με την παρακολούθηση διαδικτυακού προγράμματος

Σε ποιόν κλάδο ανήκε το διαδικτυακό πρόγραμμα που παρακολουθήσατε; *

- ◯ Ανθρωπιστικές & Κοινωνικές Επιστήμες
- ◯ Υγεία & Ομορφιά
- ◯ Τουρισμός & Εστίαση
- ◯ Τεχνολογία & Πληροφορική
- ◯ Οικονομία & Διοίκηση
- ◯ Ξένες Γλώσσες
- ◯ Τέχνες & Πολιτισμός
- ◯ Επιχειρηματικές & Επαγγελματικές Δεξιότητες
- ◯ Περιβάλλον & Ενέργεια
- ◯ Άλλο: _____

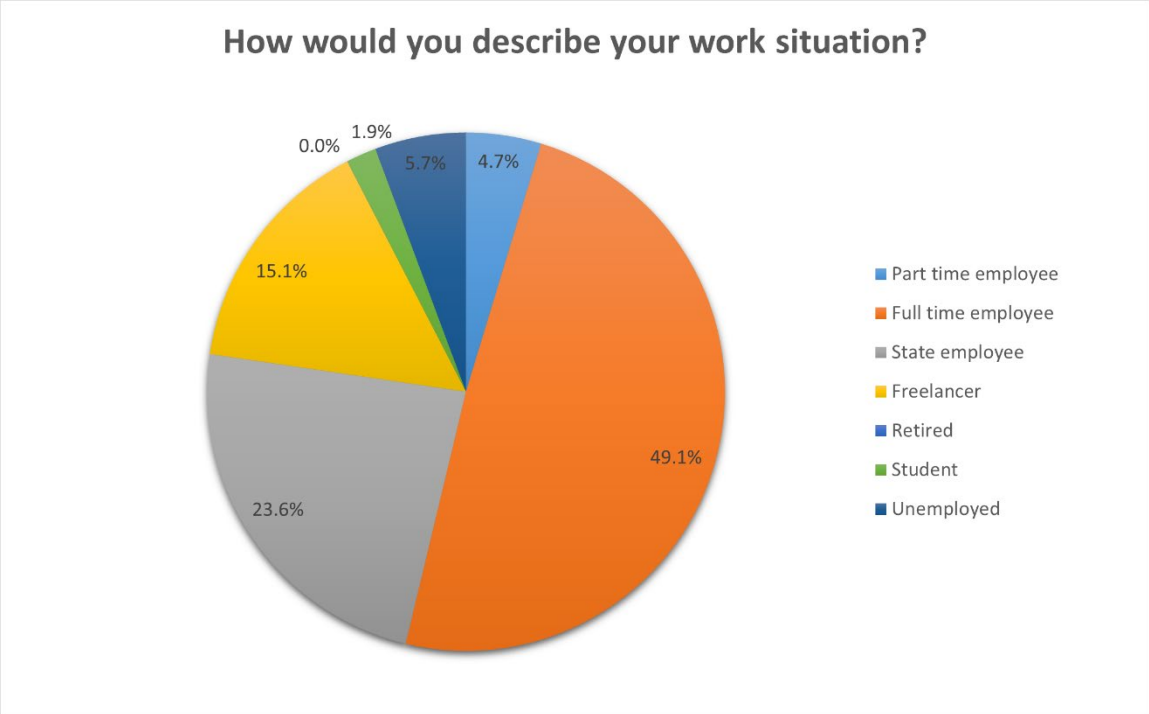
Σε ποιον από τους παρακάτω φορείς διοργάνωσης διαδικτυακών εκπαιδευτικών προγραμμάτων έχετε παρακολουθήσει προγράμματα; (περισσότερες από μια επιλογές) *

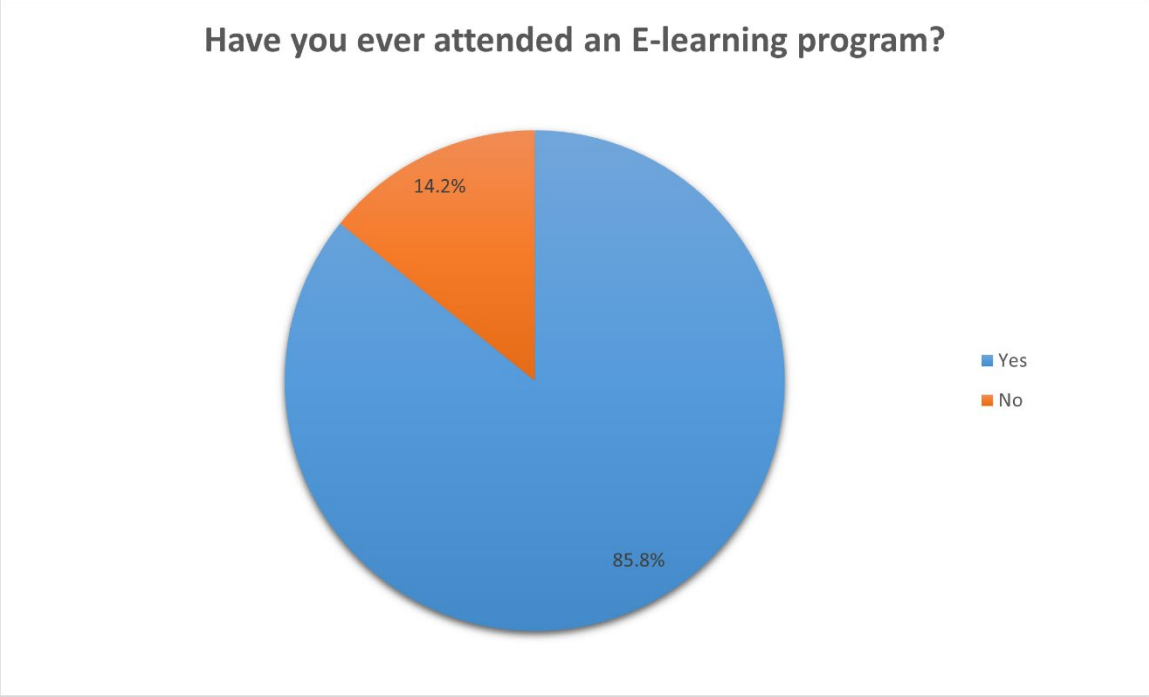
- [ ] e-learning ΕΚΠΑ (Εθνικό Καποδιστριακό Πανεπιστήμιο)
- [ ] Freestudies
- [ ] Coursera
- [ ] Udemy
- [ ] Linkedin Learning
- [ ] Udacity
- [ ] Mooc Aegean (Πανεπιστήμιο Αιγαίου)
- [ ] ΚΕΔΙΒΙΜ ΕΑΠ (Ελληνικό Ανοιχτό Πανεπιστήμιο)
- [ ] EdX
- [ ] ΚΕΔΙΒΙΜ Πανεπιστιμίου Πατρών
- [ ] ΚΕΔΙΒΙΜ Αριστοτελείου Πανεπιστημίου
- [ ] ΚΕΔΙΒΙΜ Παντείου Πανεπιστημίου
- [ ] Workearly
- [ ] Άλλο: _____

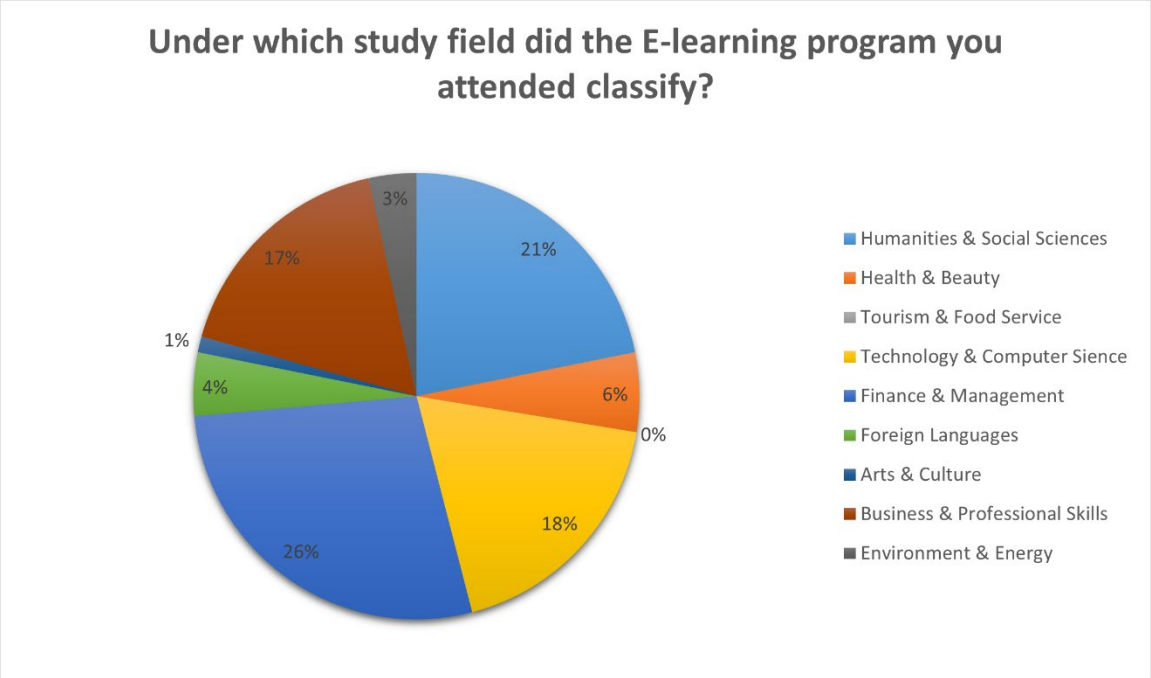
Ποια ήταν η διάρκεια του προγράμματος που παρακολουθήσατε; *

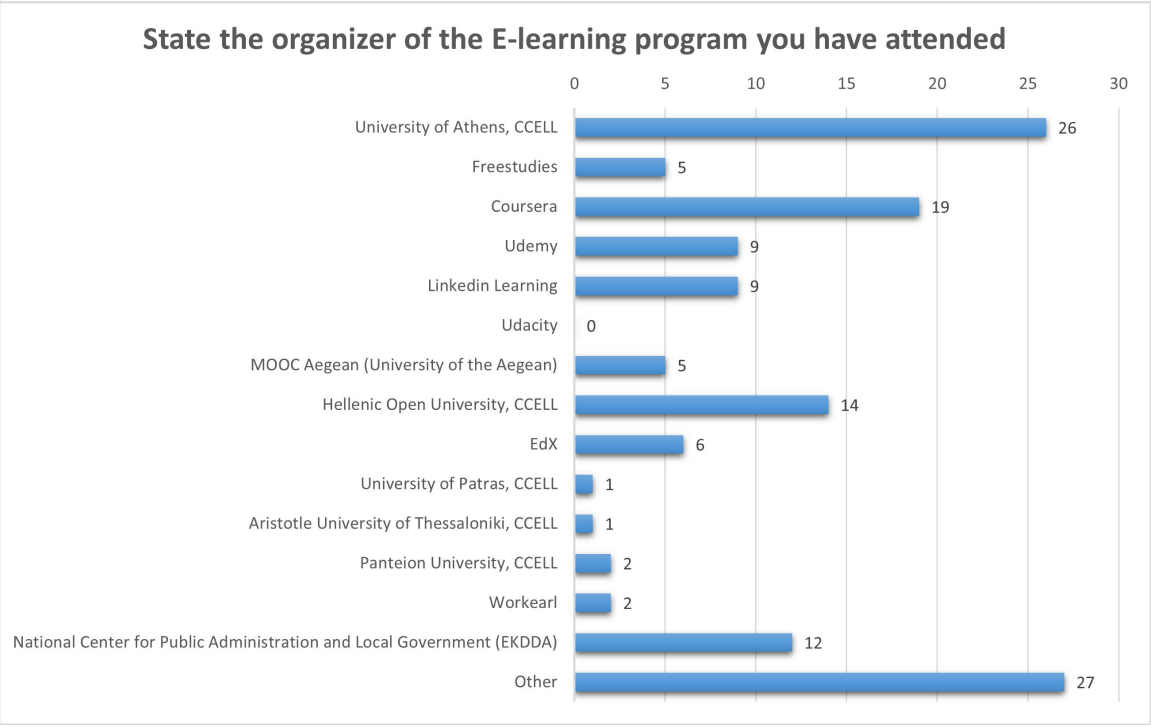
- ( ) Λιγότερο από 1 μήνα
- ( ) 1-3 μήνες
- ( ) 3-6 μήνες
- ( ) 6-9 μήνες
- ( ) Περισσότερο από 9 μήνες

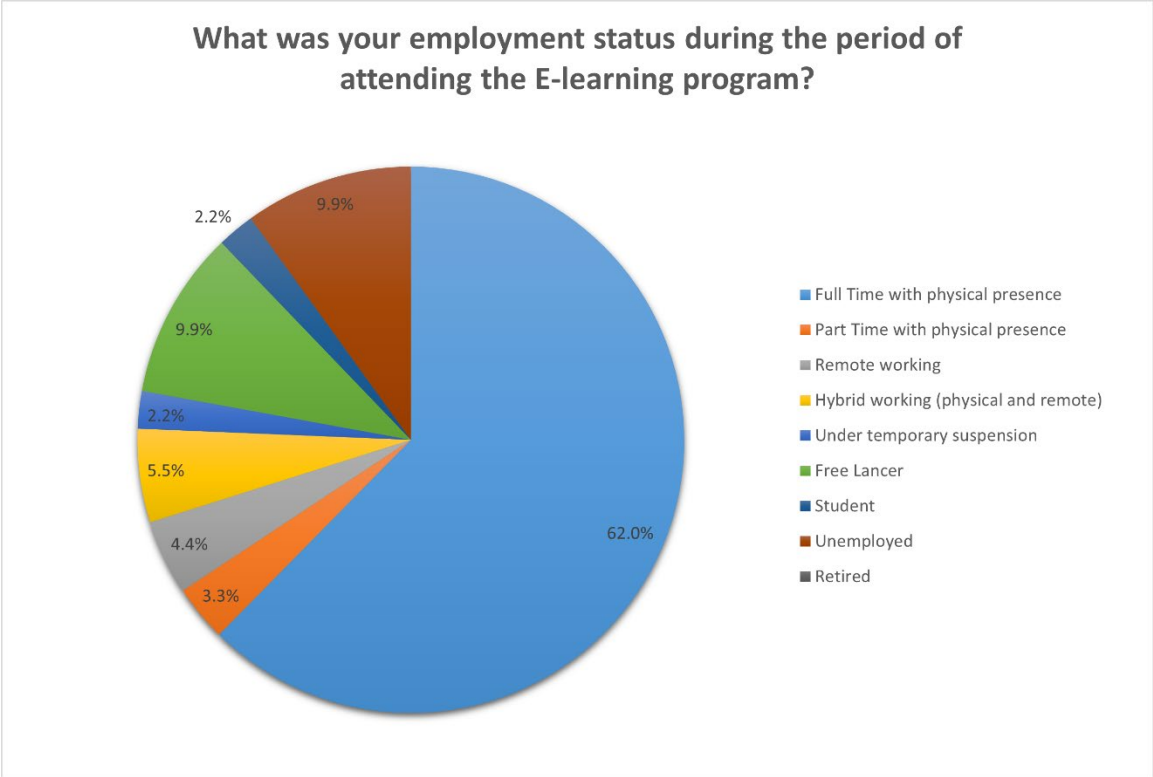
Appendix II

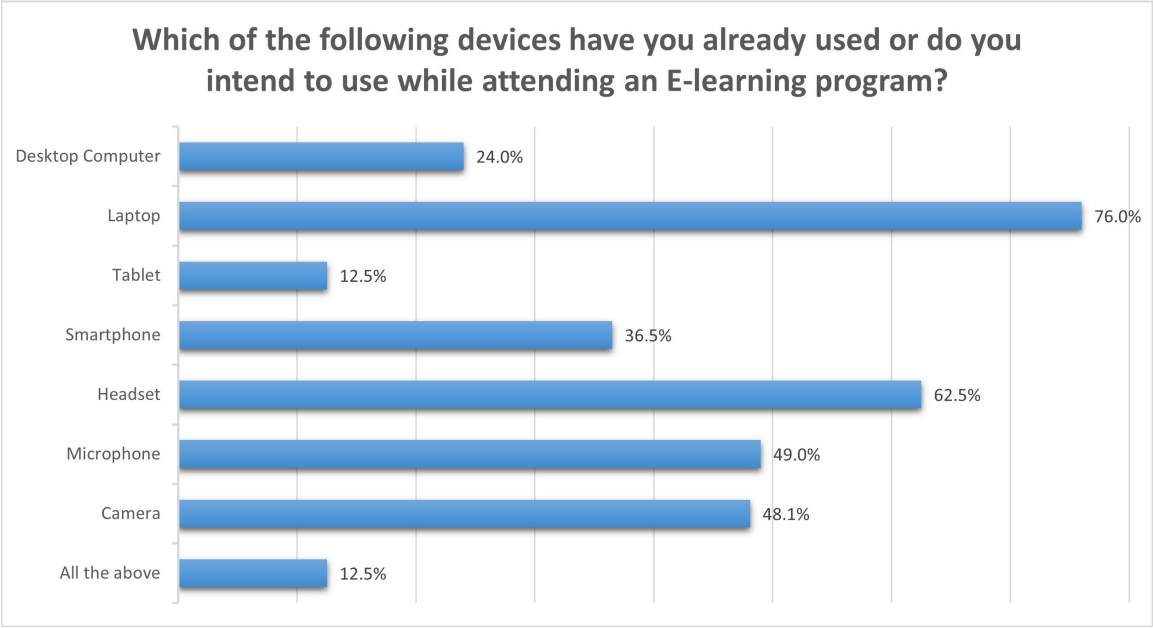

How would you describe your work situation?
4.7%
49.1%
23.6%
15.1%
0.0%
1.9%
5.7%
Part time employee
Full time employee
State employee
Freelancer
Retired
Student
Unemployed

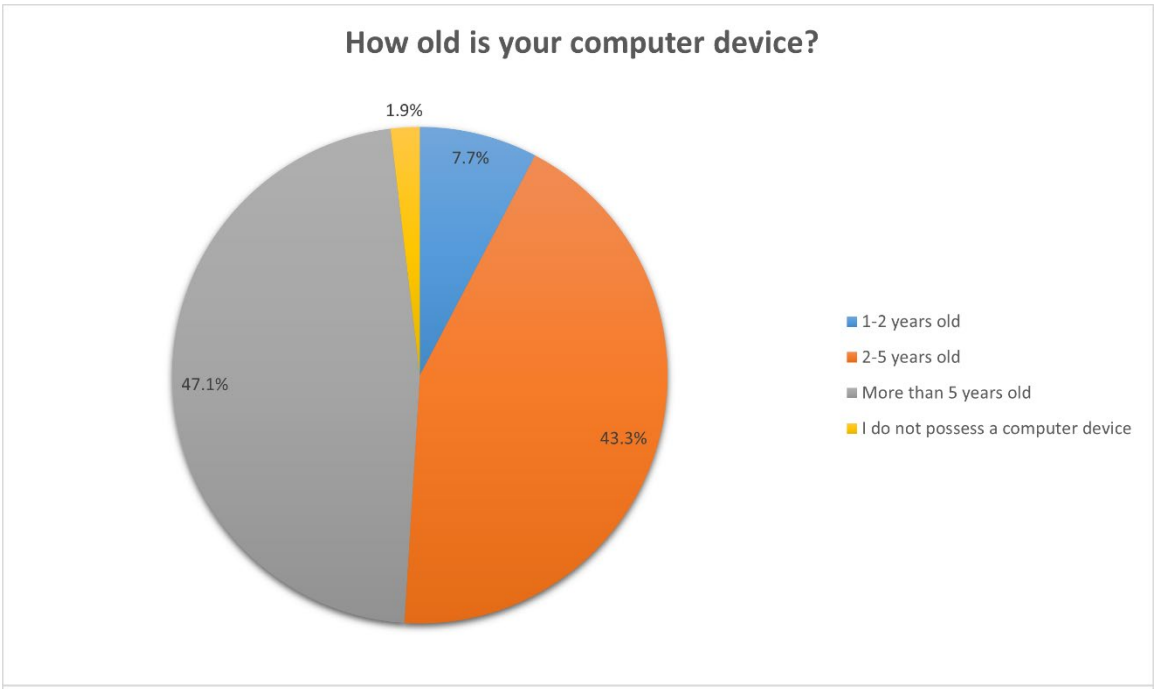

Have you ever attended an E-learning program?
14.2%
85.8%
Yes
No

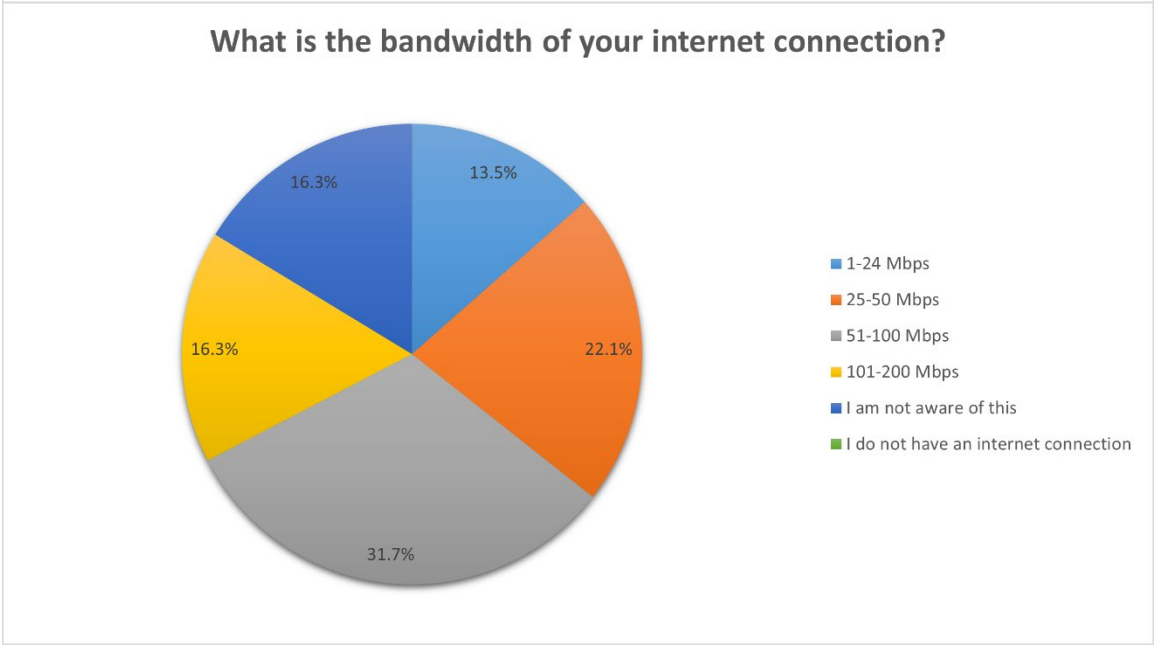

Under which study field did the E-learning program you attended classify?
21%
6%
0%
18%
26%
4%
1%
17%
3%
Humanities & Social Sciences
Health & Beauty
Tourism & Food Service
Technology & Computer Sience
Finance & Management
Foreign Languages
Arts & Culture
Business & Professional Skills
Environment & Energy

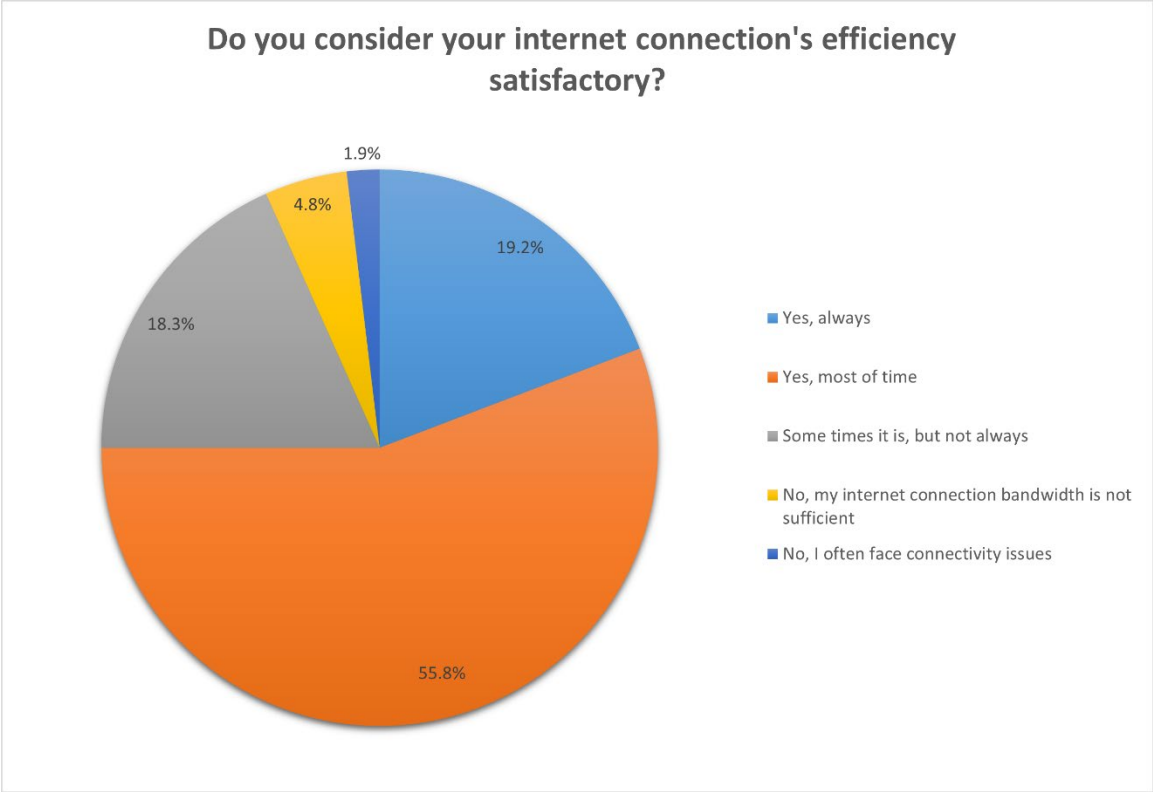

State the organizer of the E-learning program you have attended
0
5
10
15
20
25
30
University of Athens, CCELL
26
Freestudies
5
Coursera
19
Udemy
9
Linkedin Learning
9
Udacity
0
MOOC Aegean (University of the Aegean)
5
Hellenic Open University, CCELL
14
EdX
6
University of Patras, CCELL
1
Aristotle University of Thessaloniki, CCELL
1
Panteion University, CCELL
2
Workearl
2
National Center for Public Administration and Local Government (EKDDA)
12
Other
27


What was your employment status during the period of attending the E-learning program?
2.2%
9.9%
9.9%
2.2%
5.5%
4.4%
3.3%
62.0%
Full Time with physical presence
Part Time with physical presence
Remote working
Hybrid working (physical and remote)
Under temporary suspension
Free Lancer
Student
Unemployed
Retired


Which of the following devices have you already used or do you intend to use while attending an E-learning program?
Desktop Computer
24.0%
Laptop
76.0%
Tablet
12.5%
Smartphone
36.5%
Headset
62.5%
Microphone
49.0%
Camera
48.1%
All the above
12.5%


How old is your computer device?
1.9%
7.7%
47.1%
43.3%
1-2 years old
2-5 years old
More than 5 years old
I do not possess a computer device


What is the bandwidth of your internet connection?
16.3%
13.5%
16.3%
22.1%
31.7%
1-24 Mbps
25-50 Mbps
51-100 Mbps
101-200 Mbps
I am not aware of this
I do not have an internet connection


Do you consider your internet connection's efficiency satisfactory?
1.9%
4.8%
19.2%
18.3%
55.8%
Yes, always
Yes, most of time
Some times it is, but not always
No, my internet connection bandwidth is not sufficient
No, I often face connectivity issues