Cyprus University of Technology
Tallinn University
MSc Interaction Design

SOCIAL INTERACTION IN E-LEARNING ENVIRONMENTS:

DESIGN OF A SOCIAL MEDIA PLUGIN FOR E-LEARNING ENVIRONMENTS

Master thesis

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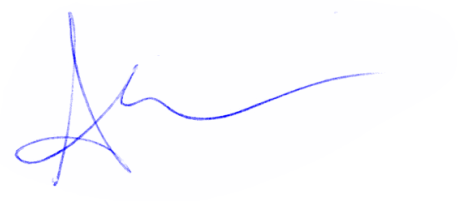

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Abstract

For centuries, the process of acquiring knowledge has been intertwined with the face-to-face teaching and interaction of participants within an educational environment. The outbreak of covid-19 drastically changed the existing situation, degrading traditional teaching methods. It made E-learning the main education option for a period that no one knows how long it will last. In order to achieve higher learning efficiency, the E-learning has to achieve two diametrically opposed goals at the same time, keep the students at a distance but bring the students closer. This study deals with social interaction within the E-learning environments. Through the use of various methods, techniques and consecutive research phases, the study covers the topic from students attending E-learning courses perspective. The results present the frustration of students for the existing level of social interactions in the E-learning field along with their desire for solutions that will improve the existing situation. The study concludes with a prototype of a plugin created for existing E-learning platforms that will boost social interactions within them.

Keywords: social interaction ; e-learning ; social media ; distance learning ;

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List of Abbreviation

BSc	Bachelor of Science
MSc	Master of Science
Covid-19	Coronavirus disease
E-courses	Electronic courses
E-learners	Students of E-learning
E-learning	Electronic learning
E-mail	Electronic mail
E-shops	Electronic shops
Ed-tech	Educational technology
MOOC	Massive open online course
USD	United States dollar

1 INTRODUCTION

Living in a world where everything is related to the internet, where mails have been replaced by e-mails and e-shops have replaced local shops, education could not be an exemption to it. E-learning has become a global trend and retains a growing reputation year by year . Despite the fact that it was created in order to play a supplementary role to education, this has been changed. E-learning is not anymore considered as a tool that educational institutes use as an option, but as a core field of the global education system.

Electroning learning (known also as E-learning) emerged as a evolution of distance learning methods and it is considered as a form of education via the Internet, networks or standalone computers (Kashora et al., 2012). A whole new educational category that could change dramatically the way that education was spread and turned education -which for centuries was the privilege of few- into a good that could be affordable by everyone and could become a game changer in the battle for a better world.

However, E-learning was a new field that was still under construction and despite the rapid growth of the technology was still facing problems, ethical barriers and obstacles to overcome. All these were dramatically worsened when the covid-19 crisis occurred. E-learning stopped being a field under construction but had to transform in the environment that would take care of education in all of its forms for all the period that this crisis would last.

Through the last year e-learning made tremendous progress, numerous new applications were created, people learned how to use e-learning sources, new platforms were formed, and the existing ones were upgraded (De Villaumbrosia, 2020) . However, the problems that occurred in the field not only remained but worsened. Education is not only about gaining knowledge, but it applies in many other crucial forms of personality fields, such as social interaction, social cooperation, relationship between students and teachers and more.

Replacing traditional ways of education with technology-related ones means that the new solution should provide the student the same level of knowledge that the traditional education did and the same atmosphere and the same options for cooperation and social interactions.

This thesis will try to cover the field of social interaction in e-learning environments from the perspective of students that are attending e-courses, will investigate the existing situation, speak with the stakeholders, conduct a research and finally create and test a prototype of a social interaction plugin for e-learning environments.

1.1 Research Problem and Significance

The world as we know it was built through the progress of human civilization, a civilization that relied on education and the dissemination of knowledge to overcome the obstacles it encountered.

However, knowledge is not an individual affair but a collective process. No excluded society has progressed, or its sciences have prospered. It is the interaction with other cultures that has pushed progress and changed the world. If we assume that educational environments are microcosms of society, then the acquisition of knowledge implies interaction with others participating in them, an interaction that for centuries took place in the environments of traditional teaching.

But in a world that is changing day by day, the advancement of technology has impacted the way education is being approached (Rosli et al , 2016) and traditional learning has been largely replaced by e-learning. Despite the fact that e-learning copes well in its educational tasks, it neglects the importance of social interactions, something that can be an obstacle not only for the development of the field but also for the general development of societies.

E-learning intends to replace traditional teaching methods, but this cannot happen unless it upgrades the importance of social interactions in its environment. Social interactions have always been a key part of the knowledge acquisition process (Alonso et al., 2015) and should

not be degraded, otherwise the side effects of such degradation can have dramatic consequences.

Learning environment is a place that besides knowledge, people learn to socialize, interact with others and build relationships, however the studies (Croft et al., 2010; Bibeau, 2001) showed that many e-learners not only did not social interact with other students but felt isolated.

The factor of e-learners isolation in conjunction with the emerging condition in which e-learning has become the main method for delivery of knowledge can lead to a whole generation of people that will underestimate the importance of socializing and team working, not only in education environments but in all of the circumstances.

1.2 Research Goal and Motivation

The purpose of this study is to focus on the social aspects of students' participation in e-learning environments, to speak with the main stakeholders, take a glimpse of the situation that have emerged in e-learning due to the ongoing covid-19 outbreak and finally present a solution that could boost the level of student's social interaction.

E-learning is a field that has been researched numerous times in every single aspect that includes, so this study will not have a target to present one more general overview of the topic. The impact that social interaction in the learning experience had already been examined (Alonso et al., 2015; Downes & Siemens, 2008; Okita, 2012; Scardamalia & Bereiter, 2010) along with the impact that has in e-learning environments (Baber, 2021; Cobb , 2009; Dhamija ,2013; Gray & Diloreto , 2016). Most of the findings agree that social interaction is vital for the efficiency of an elearning environment, however despite the outcomes few things have been made and few solutions have been proposed. The main trend of the thesis focused on techniques that the teachers should apply during the lessons in order to boost the social presence of the students, something however that could propose a solution in periods where the e-learning had a supplementary role in learning of students.

Due to the covid-19 crisis, e-learning became not an option but a basic need (Li & Lalani , 2020). The huge number of new users (De Villaumbrosia , 2020) that are registered every day are creating new problems for research at a tremendous pace, a pace that the scientific community and the field of e-learning was not prepared to face. Students will have to rely on e-learning platforms for their education, but at the same time will have to rely on them for their social interaction with their classmates, something that existing e-platforms are unable to carry out adequately.

This research will focus on the problem that is related with social interaction of students in e-learning environments, but from a student's perspective. After thorough reviewing of literature and students thoughts will present its main findings and propose a different approach for the boost of socialization in the e-learning environments, an approach that will combine the field of social media and e-learning platforms via a plugin that will be virtually represent the courtyard of an educational institute and everything that tooks place in it such as face to face interactions amongst students, participation in happenings and extracurricular activities.

1.3 Research Question

As mentioned above this thesis will try to cover the topic of students' social interaction in an e-learning environment and this question will be the core around which the whole research will expand. The main research question will be:

- How can we boost student's social interaction inside an e-learning environment?

However, since the topic consists of many factors that applied to many fields, two additional questions will have to be answered through this research.

- How can we transform a university's campus attributes to electronic format?
- How to improve the relationship between distance students with teaching staff and other students?

1.4 Research Procedure

Due to the complicated nature of the topic, the research will combine methods and tools to research it from all aspects. At the first phase a literature review will give an overview of the existing situation and will make a brief presentation into the topic, then a quantitative research will be conducted in stakeholders related with e-learning.

At the next stages of the research, the data that will be obtained by the quantitative research, will be analyzed and formed the basic components of the qualitative research in which, some of the participants that took part in the first phase will be interviewed in questions that will be related with the outcomes of the quantitative research.

The outcomes of the interviews will be used for the design of a prototype of a “social media style” plugin for an existing e-learning platform that will have as a target to increase the level of social interactions of the students in the e-learning field.

Finally, the prototype will be tested by the same participants that were interviewed and the results will be analysed and presented at the final chapter of the thesis.

2 Theoretical background

The following section will include a brief presentation of the two topics that along formed the research topic, social interaction in learning environments and e-learning. In this chapter the significance and the value of these topics will be analyzed, along with some cases that structure the field of e-learning. The presentations will be brief and to the point, avoiding following the usual pattern of chronology of each field and focusing on the impacts that social interactions had on education and society in general.

2.1 Distance learning

The process of distance learning is a method of learning in which the physical presence of the student is not needed, and the lessons can be carried out in two different places. Distance learning's history applied in three different centuries, with the 19th century being the starting period of the field, 20th century being the era where it gained reputation and became famous amongst students and the 21st century made the field competitive to traditional ways of learning.

According to "elearningindustry" website (Pappas, 2013) the term "distance education" was first used in 1892, in a pamphlet by the University of Wisconsin-Madison in the USA. Distance learning in the 19th century was mostly carried out through mails or postcards and was not widely used. In the 20th century, with the rapid growth of technology, the field of distance education became a normality for thousands of students. Students no longer received educational materials via mail but thanks to television and radio could view or listen to the information in their home.

In the early 1930's experimental television teaching programs were produced at the University Iowa, Purdue University and Kansas State College (Demiray & İşman, 2014). With the advent of space technology in the 1960s, satellite delivered educational systems were implemented and distance education became popular amongst educational institutes, mostly in USA (Swanson, 2010). In 1969, the Open university found in the United Kingdom, a university that was the first to focus completely on distance learning accredited courses

(Pappas, 2013) and started a trend that a variety of countries followed (Demiray & İşman, 2014).

During the 1980's, the University of Wisconsin, which has a state-wide audio-teleconferencing network, enabled professors at one side to deliver lectures to multiple classroom sites around the state and facilitated two-way communication between professor and students (Demiray & İşman, 2014).

However, the great outbreak that created the field of distance education as we know it today, was the inventions of both personal computers and the world wide web, which transform the existing methods of sharing knowledge and create an interactive education field that was called e-learning. In 1989 the University of Phoenix became the first institution to launch a fully online college institution that offered both bachelors and master degrees while nine years later entrepreneurs Glen Jones and Bernand Luskin founded the Jones International University, which became the first accredited and fully web-based university (Florida National University, 2019).

In the late 90s and in the start of the 21st century the growth in technology was so rapid that it is difficult to mark some events as milestones for the field of distance learning. The field of E-learning had been created, and had been differentiated from being just another distance learning method, creating a whole new universe that would change the field of education once and for all.

2.2 E-LEARNING

E-learning as a term is really complicated and has created multiple controversies and disagreements amongst researchers (Janelli, 2018) . Andrews (2011) referred to e-learning as a learning process that make use of electronic media and can took place both online and offline while Pange and Pange (2011) focused more on the relation between e-learning and internet by stating that e-learning is the delivery of concise and dynamic educational content and instructional methods through the world wide web, content and methods which aims to build knowledge and skills amongst students. Finally, a more balanced definition can be found

at Oxford's dictionary (Oxford , n.d.) where e-learning is referred to as a type of "learning conducted via electronic media, typically on the Internet".

Although a lot of related terms such as "virtual learning" or "online learning" have been used in the past, the first to mention the term "E-learning" in a professional context was the Elliot Masie, in a TechLearn conference at Disney World in November 1999 (Cross, 2004). Despite the fact that e-learning means electronic learning and distance learning via the use of electrical machines was something that occured in the start of the 20th century, a large percentage of researchers have related the e-learning industry with the field of personal computing and world wide web, something that could be explained due to the fact that e-learning become a global trend in the period were personal computers and world wide web were accessible to a large part of the world.

The reason that pushed many researchers to relate the field of e-learning and the internet, is a topic that would be in the core of the research of this study, the learning experience and how this can be achieved. Learning is more than the obtaining of knowledge or reading some data on a screen. Learning includes interpersonal relationships, social interaction and a variety of attributes that could not be achieved till the invention of the world wide web and even the evolution of the web 2.0 technology. Web 2.0 is a technology that was implemented around 2004 and transformed the existing world wide web by presenting more interactive and interoperable websites where the user could contribute, collaborate and share content with other users.

This new form of the internet led to a popularity of the medium and created the internet in the form we know it. It also had a positive effect on the configuration of e-learning fields. E-learning stopped to be used only by large educational institutions as a way of presenting data and knowledge to users but gave the opportunity for the creation of virtual classrooms where students could have the same options for active presence as they had in a regular classroom on the campus.

However, all the ambiguities that were mentioned above regarding the nature of e-learning and if this is only related to the internet or is a continuation of traditional forms of education that make use of technology, have created serious limitations on the field. E-learning as a field

does not know if it should rely on traditional ways of education and try to virtually represent them in an online environment or it is a completely new sector of education that should implement its own regulations and standards regarding the learning activities.

2.3 Impact of social interaction in learning

For thousands of years education has been related with social interaction. It is believed that one of the factors that led to the creation of the legend of Alexander the great was that in young age he attended lessons by the famous philosopher Aristotle, but in contrary with what was usual for royals in these periods, he did not attend alone but as a member of a group, along with other children of Macedonian nobles. Alexander became part of this group, interacting with other children, they gained knowledge together, they became friends and finally many of them became generals and commanders in his legendary asian campaign.

This example highlighted the importance that social interaction has in education, even from ancient times. Education should not be interested just in obtaining knowledge, but additionally to build knowledge. According to Scardamalia and Bereiter (2010) knowledge building differentiates from learning and is about creating or modifying public knowledge that will be available to anyone to take advantage of it. Knowledge building is a framework for collective knowledge through group discussions, group debates and teamwork. Learning is designed to increase individual knowledge, whereas knowledge building is a social process that aims to continuously improve ideas as collective knowledge that adds to individual knowledge (Alonso et al,2015). Interacting with other people has proven to be quite effective in assisting the learner to organize their thoughts, reflect on their understanding and find gaps in their reasoning (Okita,2012).

Educational system in most of the countries is created in such a way that gradually evolves a person's knowledge and social presence. From the younger ages and the first social group of kindergarten to high school and college, social interaction and knowledge are considered of the same importance for a person's growth. Like all social systems, the school and the classroom is made up of a network of interpersonal relationships structured to facilitate the achievement of educational goals (Johnson, 1979).

Bandura (1993) in his research highlighted the role of schools, as social environments in which students create ideas and share thoughts and values that follow them in their life. Many researchers have focused on the relationship between students in the learning environment with Dixson (2010, p. 2) saying that "One of the recurrent themes in the literature is the effectiveness of using collaborative activities, group discussions and other forms of student-student interaction". Interaction between students is crucial for learning environments due to the fact that it supports productive and satisfying learning and assists students to develop problem-solving skills (Kolloff, 2011).

Woodman et al. (1993) referred to the importance that communication and exchange of information and ideas had in group working while Leenders et al. (2003) and stating that in order to achieve innovation there must be ideas and these initially appear from among individuals in the team, a new idea dies unless it finds a breeding place.

Some researchers (Haythornthwaite, 2002; Harasim et al., 1995) have focused on the relationships that are created inside the learning environments and how these evolved and what impact are having among the students. Relationships are formed through debates, information and belief exchanges and its significance is so important that it can form a student's personality and its main beliefs regarding society and life (Urdan & Schoenfelder , 2006).

2.4 Social interaction in e-learning

When social presence comes to terms of e-learning environments, things are differentiated a while. For thousands of years, learning and teaching always took place in close proximity and this has become firmly anchored in human consciousness (Lee & Rha, 2009). However, things changed with the technology that created classes and learning environments inside the screen of a computer, changing once and for ever the education sector. Unlike online learning, the classroom learning method is more real and students have an opportunity to debate, deliberate and discuss with their class teachers and friends (Sathishkumar et al.,2020). Things that in traditional classroom learning are considered normal in e-learning may be not possible

or difficult to happen, as McInnerney and Roberts (2004) stated social interaction with peers and educators can often be an exercise in frustration for students studying in an online environment. As suggested by Ashar and Skenes (1993), specific learning objectives may attract adults to an online program, but it is the presence of a social environment that can keep them engaged in the learning activities.

One of the challenges of online learning relates to students feeling disconnected to their classmates and instructor (Gray & Diloreto , 2016) and this loss of connection is one of the key factors that determine the experience that e-learners have and form the way they judge the whole field. Swan (2003) in order for someone to consider an e-learning environment effective, set as a goal to provide the same level of knowledge that the institute's other modes of delivery provide.

Social presence in online learning environments refers to the degree to which a learner feels personally connected with other students and the instructor in an online learning community (Sung & Mayer, 2012), however Gunawardena and Zittle (1997) in their article make a split between the terms of social presence and social interaction, considered them two different things. McInnerney and Roberts (2004) compare the on-campus students and e-learners and highlight things that e-learners are losing due to the nature of distance learning, stating that on campus, students tend to assemble and interact before, during and at the conclusion of class, something that is the beginning of strong relationships and friendships.

The above example was only one part of the term that is called "student isolation" which is considered to be a major problem that distance learners face and which attract the interest of many researchers (Lim & Vignarajah,2018; Croft et al., 2010; Bibeau, 2001). Distance learners often experience social isolation and impoverished social interaction with their remote peers (Sun et al., 2019). McInnerney and Roberts (2004) in their report stating that the feeling of isolation is not always generated because of geographical distance and that sometimes the same feeling may occur in on-campus students undertaking an online course. Sher (2009) stated that Online students are often geographically isolated from the academic community. This isolation creates a gap, a gap that teachers should close, but what is the actual gap between teachers and e-learners?

Sampson (2003) believes that one of the most common problems of the majority of e-learning courses is the limitation of dialogue between teachers and learners and amongst learners themselves while Kirkup and Jones (1996) stated that students need dialogue with their teachers and with other students in order to consolidate and check on their own learning. The role of teacher was always important in learning environments, however due to the nature of distance learning, the role of teacher in e-learning is the most crucial, is the person that must create bridges of communication between the student, the institution and the other classmates.

As the years go by, many teachers become more specialized in learning and find new methods or use new tools through which they want to close the gap that separates them from distant students. The use of group work, gaining ground year by year, is considered the number one solution to tackling diminished social interaction. However, group working in distance learning courses have serious difficulties with Ekblaw (2016) stating that the greatest challenges involved in the use of online tools for collaboration are the diversity of technology and distance of the group members. Adding people from different countries with different ages and cultures in a team and assigning them a task, except of being risky, can also have negative effects and cause problems between them since students are operating with only a limited understanding of their fellow students' personalities and behaviors (Lieberman, 2018).

Despite the drawbacks that a group working in e-learning may have, it is still valuable due to the fact that is probably the only thing that is related with socialization of the participants in an e-learning course. Education environments that were traditionally the birthplace of friendships, strong relationships and were forming a large part of the social aspects of a person, are about to become places of isolation, where the only thing that will can provide to a person will be knowledge. knowledge that a person can also obtain through a web encyclopedia like wikipedia, something that will make people question and finally downplay the importance that knowledge has.

2.4.1. An overview of empirical studies regarding social interaction in e-learning

The importance that social interaction has in the learning environments is something widely accepted, as well as the fact that e-learning environments should focus more on encouraging social interaction amongst their students, however the way that this will be implemented is not easy. There are multiple factors that should be taken into consideration and several fields that need to be researched in order to gain a better understanding of what should be the measures that would help students attending an e-course participating more actively and interact during the lessons.

Hrastinski (2008) on his case study mentioned that synchronous communications can affect the participation in online discussions in a positive manner, based on the results from the students showed that they feel more active in the learning process and were encouraged to participate feeling that someone is hearing their ideas and could interact and discuss with them.

The research made by Perveen (2016) showed that students are missing the process of knowledge building that is achieved through synchronous classroom's interactions, however they seemed satisfied with the existing situation and were more in favor of the ideal blend of the two modes of instruction.

On a research conducted by Dhamija (2013) students appeared to have a positive reaction regarding e-learning and its current social impacts on their lives. On the same research an interesting factor regarding e-learning was mentioned, where students from rural areas appeared less satisfied by e-learning, something that had to do with their limited technologic equipment. Designing for such a multifactorial field like educational environments required to take everything into consideration before finalising the product. For example, in the above situation, if a designer did not think about the difference of the equipment that students may have and design a solution that will only allow students with greater internet connection or laptop to efficiently participate can lead to a further gap between students and worsen their social relationships.

Additionally, Ekblaw (2016) in his research suggests that even if the group working is a valuable tool that can assist the learning experience in e-learning environments, a number of factors should be taken into account in order to ensure the success of the project. Bringing

people from different countries, of different ages working as part of a group can either encourage or discourage them to further enroll in e-learning and the possibility of an unpleasant experience should always be taken into consideration.

Last but not least some research studies (Alghizzawi et al., 2019; Mnkandla & Minnaar , 2017 ; Rosli et al , 2016) focus on the role that social media can play in the boost of social interaction through students in the e-learning environments and how social media usage could positively affect e-learning adoption, particularly perceived interest, knowledge sharing and social media features.

These last researches (Alghizzawi et al., 2019; Mnkandla & Minnaar , 2017 ; Rosli et al , 2016) explored the possibilities that social media can provide to existing e-learning platforms and boost the level of social interaction of the participants in a safer way, without the risk of changing core attributes of e-learning. Social media are a reality and a field where the majority of people (especially young) is interested in, e-learning is a new reality where the students should start to get use of it, so the combination of these two fields could create a solution that would positively affect the level of social interactions in -elearning environments.

Some studies (Saxena et al., 2021 ; Adnan & Anwar , 2020) covered the e-learning field that emerged due to the ongoing covid-19 from a student's perspective. Both of the studies highlighted the potential that e-learning has, however in the Pakistani case study (Adnan ,& Anwar , 2020) it was stated that despite the positives that e-learning has it not as effective as conventional learning.

2.5 The transformation of e-learning

Living in an age where everything is changing rapidly, E-learning could not be an exception. From its first steps, until the current situation, this field of education has gone through many stages and it has changed forms, stakeholders and target groups multiple times. Starting as a branch of the technology in the education field, moved to a supplementary tool for traditional education methods then turned as a main competitor of traditional education and finally

became the main system that keeps education alive amid an unprecedented health crisis that stood the world.

The landscape of distance education is changing (Eom & Ashill, 2016) at a pace that no one could predict and no one knows how it will evolve in the next few years. COVID-19 has forced the universities around the world to adopt online learning (Almaiah et al., 2020) and even if the pandemic crisis would stop one day, the changes in the field of education would remain. Two of the main factors that have abruptly mutated the e-learning field are the massive open online courses that have become a trend both by universities and e-learning platforms (such as Edx, Udemy and more) and the urgent need for distance learning that occurred due to the pandemic crisis.

2.5.1 E-learning and Covid-19

During the last year everyone in the world had been affected by the covid-19 crisis, a crisis that has changed in many situations the world as we knew it and caused dramatic changes in multiple fields of life. Education might be one of the fields that was the most affected and more specifically the field of e-learning education transformed inside a night from a supplementary field to the field that should "carry" all the educational activities for a serious period of time, who nobody knows when it will stop. Covid crisis and the impacts that will have in the e-learning environments become a topic that attracts the interest of multiple researchers and scientists (Affouneh et al., 2020; Dhawan, 2020; Ebner et al, 2020; Soni, 2020).

It is estimated that 1.2 billion children in 186 countries were affected by school closures due to the outbreak of the virus (Li & Lalani, 2020), something that led to a blast in the market of so-called ed-tech with literally thousands of new start-ups companies being founded with a revenue that reached 2 billion USD in 2020.

The E-learning sector was not prepared for such a situation and despite the fact that reacted satisfactorily and raised the duty of replacing traditional methods of learning it is obvious that the quality of learning and other attributes of it have received damage. The sudden shift

towards online education has raised concerns over the quality of learning, effectiveness, learning outcomes and student satisfaction (Baber ,2021)

Governments and institutions succeed in their first goal, to replace the learning attributes of traditional ways of learning to an e-format that will be accessible from any device, however the worst are yet to come. Educational institutes do not offer only knowledge and data, but a whole package that includes socialization, human interaction, group working, personal relationship and more. The side effects of ignoring all these aspects of learning environments can be tremendous and create different societies and a new generation that will have a lack of social attributes.

2.5.2 MOOCs in the COVID era

In old times, the average adult had to stop attending learning courses after a certain age as the circumstances and the limited educational tools made it impossible. Nowadays this rule has been overturned. Easy and freely available information as well as job competition have pushed many people to search for courses and seminars that either would benefit them in their level of knowledge or they will help them enforce skills that are related with their professions. These factors affect the potential of MOOCs and create a whole new education field with millions of participants and billions of revenues.

MOOC is an acronym for massive open online course, courses that aimed at unlimited participation and open access through the internet. What started as an experimental course (Downes & Siemens,2008) with only 2,200 learners has become a global trend that by the end of 2020 had 180 million learners (Shah, 2020). More specifically, a MOOC is course taught online which can be attended by a large number of participants, has a defined duration of few weeks and follows a certain pedagogy in which initial weeks are spent in understanding the content while the last one or two are used for submission of final presentations (Shilpi & Goel ,2014).

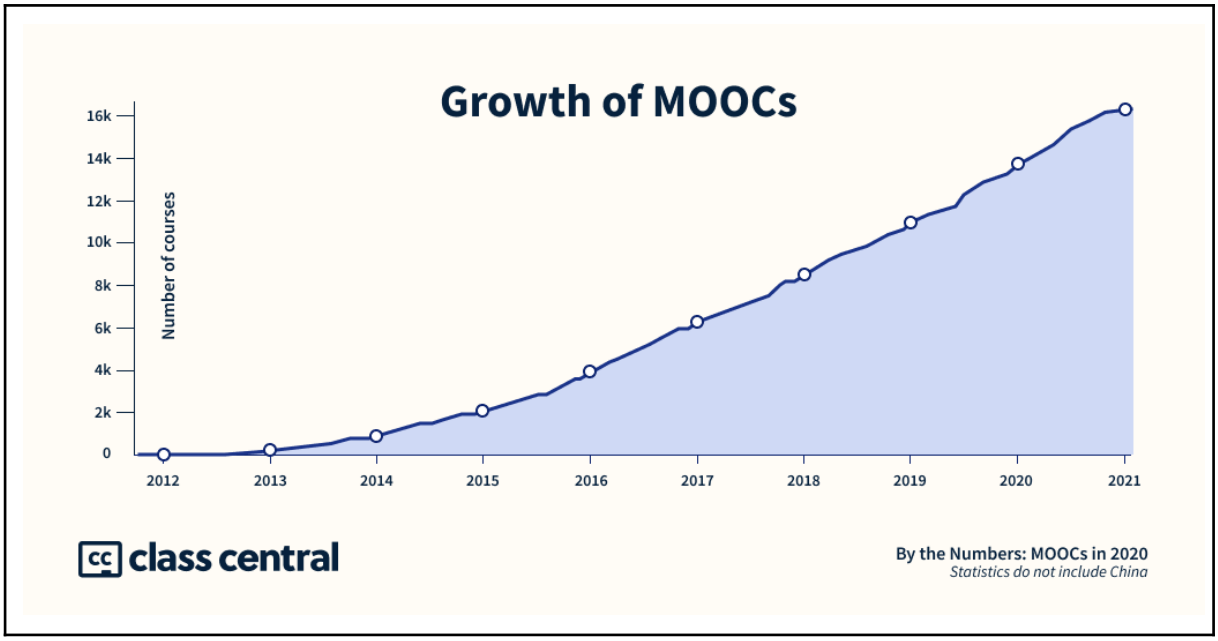

FIGURE 1. CHART WITH THE GROWTH OF MOOCS FIELD (SHAH , 2020)

MOOCs created as an open education movement, however due to their tremendous success , quickly attracted economic giants and the nature of them became more complicated and moved away from the original target. Some courses put prerequisites, other placed tuition fees, while many institutions used MOOCs solely as a marketing tool (McGreal,2017).

Table 1. Statistics from four different MOOCs providers (Shah, 2020)

	Learners	Courses	Microcredentials	Degrees
Coursera	76 million	4,6003	610	25
edX	35 million	3,100	385	13
FutureLearn2,4	14 million	1,160	86	28
Swayam2	16 million	1,130	0	0

Nevertheless, the MOOCs not only have positives but include risks and serious disadvantages. MOOCs have high dropout rates, lack an economic or sustainable model, face challenges of plagiarism and risk de-skilling the professoriate (Orr et al., 2015) while they do not pay any

attention at all to social interactions between the students. While MOOCs have been developed to be used by individuals, asynchronously and in a form of a single course or a brief seminar this has changed with many institutions offering whole education programs such as BSc or MSc. However the lack of social interactions between students participating at the course instead of being corrected has worsened, due to the thousands of new registered users.

Covid-19 crisis caused numerous institutions to change the delivery of their courses from on-campus to e-learning, and made e-learning a global trend that brought billions of people to access it. Nevertheless when the pandemic ends, some of the institutions and the participants are expected to return to normality and reduce the use of e-learning, something that will not happen in MOOCs where the normality is the e-learning delivery of courses. MOOCs field is heading into a new reality which will not have an expiration date and which will cause significant changes in the wider field of e-learning education.

2.6 Summary

E-learning is standing in front of a crossroad, at a crucial moment of its history that would change the field for ever, since the pandemic crisis accelerate the moment that was unavoidable, the moment where e-learning will completely replace traditional ways of learning and cover all of the aspect that the classic educational environments provided.

Platforms that are providing e-learning environments have been capable of transit aspects of knowledge and data however they struggle to adopt attributes related with social aspects of learning environments. The aspects that were referred and analyzed in the above chapters and which significance was mentioned multiple times. The new era of e-learning field had to pay attention to the students and how to make them feel like they are participating at a digital representation of a traditional learning environment, that will include all the attributes that education was providing for centuries, from the feeling of the classroom, till the social relationships that were evolved in the courtyard of school.

This thesis proposes a solution that will help e-learning platforms represent the attributes of social aspects of a learning environment through a “social media style” plugin designed in order to enhance students' social interactions in an online learning environment.

3 Research Methodology

The goal of this study is to cover the topic of social interaction in e-learning environments from a student's perspective. After a thorough research with participants that attended an e-learning course, the data that will be obtained will be further analysed and the outcomes will be used for the creation of a plugin created for existing e-learning platforms that will have a goal to strengthen the level of social interactions amongst e-learners.

This chapter of the thesis focuses on the research methodology that was followed during the research and makes a brief presentation of all of the steps that were taken from the initial to the final steps of the study including the study's research process, the participants, the research worldview and the data collection methodology. Finally, the evaluation techniques are explained, followed by the documentation of the procedure.

3.1 Research Problem and Strategy

Research methodologies and strategies that a researcher chooses to follow are based on the nature of the initial problem, the worldview that the researcher follows and what the author wants to investigate through this research.

In this thesis, the problem is related with e-learning education and social aspects of it, a problem that consists of multiple subtopics, covers several fields and includes multiple stakeholders. Such a complicated problem should be covered from all of its aspects and with every possible method in order to achieve satisfactory results. Given the limitations that were set up due to the complicated nature of the problem, the worldview that this thesis followed, was a pragmatic worldview.

3.2 Research worldview

Pragmatism may take many definitions regarding its natures but for Creswell (2014) is a worldview that arises out of actions, situations and consequences rather than antecedent

conditions, something that can explain the origin of the term, where the word pragmatism is derived from the Greek word “pragma,” which means action and which is the central concept of pragmatism (Pansiri 2005).

The origins of pragmatism as a philosophical movement were in 1870s and it was Charles Sanders Peirce the first who mentioned the term in his book “Illustrations of the Logic of Science” (Koehn,1973) . The first theoreticians who work in pragmatism believed that there are many different ways of interpreting the world and undertaking research, that no one can finally reach the absolute truth and that the world consists of multiple realities .These pragmatists declared that truth could be judged by its consequences.

A major underpinning of pragmatist epistemology is that knowledge is always based on experience. One’s perceptions of the world are influenced by our social experiences. Each person’s knowledge is unique as it is created by her/his unique experiences (Kaushik et al,2019).

In pragmatism the researcher does not follow any system of philosophy but uses mixed methods and different worldviews based on which works best for the particular research problem that is being investigated. The most common used approach for data collection in pragmatism is considered to be mixed methods, due to the willingness of the researcher to use any method given in order to understand deeply all the aspects of the problem, however this is not a strict rule, pragmatism can use only one method for data analysis if that method is the one that fits better to the research goal.

3.2.1 Data collection method

As mentioned above, it is the worldview of the research that leads to the choice of the data collection method and in this research, the worldview is a pragmatic one, a worldview where the data collection method is free to be chosen based on which fits better for the need of the research.

In a research with too many stakeholders like this and in a research where the topic under investigation is still formed then all the available methods should be used in order to have an as much more clear result and gain a better understanding of the topics from all of its aspects. Mixed methods include many different approaches where the importance of the research is based either in qualitative or in quantitative research and the timing of data being collected is based on it.

This research will follow an explanatory sequential mixed methods approach, which is a mixed methods strategy that is formed in two main phases. In the first phase the researcher is collecting quantitative data, analyzing them and based on the results is forming the second phase where conducts qualitative methods of collecting data. The method is explanatory because the data that are obtained in the quantitative research are later explained in the qualitative and it is called sequential due to the fact that quantitative research is followed by the qualitative phase. According to Creswell (2014) this type of design is popular in fields with a strong quantitative orientation (hence the project begins with quantitative research), but it presents challenges of identifying the quantitative results to further explore and the unequal sample sizes for each phase of the study.

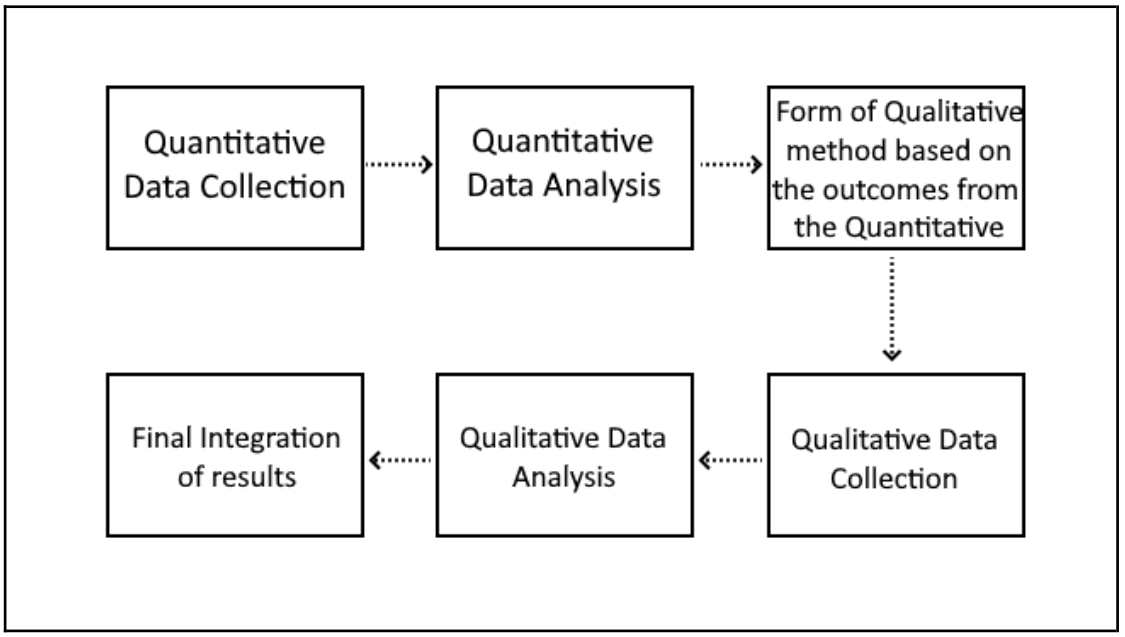

Figure 2. Phases of a explanatory sequential mixed method

3.3 Research design

The topic of research design was always one of the most difficult things to set up for researchers, because in a large percentage the quality of the design affected the final result and the general quality of the research. Things got worsened due to the outbreak of the covid-19 crisis which put even more barriers and limitations for conducting research.

This research was completely made inside the outbreak of the covid-19 crisis and this had an effect in the way that things were planned and executed. As mentioned above the methods of collecting and analyzing data was a mixed method one and the phases of the research had to be planned in a way that could turn this difficult project to a feasible one.

The research was splitted into 5 phases. At the first phase the researcher conducted a quantitative research by sending questionnaires to e-learning students. Questionnaires were focused on the social aspects of e-learning and how students rate it in their specific courses.

When the questionnaires were answered, the results of the first phase were analyzed and the outcomes formed the structure of the interviews that was part of the second, qualitative data collection phase. The outcomes of the interviews were analyzed and used in the design of the main aspects of a “social media style” plugin prototype , to be used in existing e-learning platforms.

Finally in the last phase of the research, the persons who were involved in the qualitative interviews of the second data collection phase, were called to participate again, by testing the prototype of the social media plugin for e-learning platforms in an online evaluation session.

Table 2. Phases of the research

Research Phase	Main Objective	Methodology

Theoretical Understanding	To gain a better underrating regarding the existing situation, the limitations and the possibilities of the research topic.	Literature review
Quantitative Research	To gather data that will narrow the field of research and will place the basic guidelines of where the research should focus	A questionnaires to be completed on-line by students participating in an E-learning course
Qualitative Research	To further analyze the findings of the quantitative research and to finalize the things that should be included in the prototype that will be created.	Interviews with 10 participants that took place in quantitative research.
Design Process	Creation of a “Social media style” plugin with attributes that will meet the demands of the participants, based on their feedback..	Low fidelity prototypes created by hand. Mock up prototype created in Adobe Illustrator. Interactive prototype created in Axure
Prototype Evaluation	Final evaluation of the plugin’s prototype	Evaluation sessions with the 10 interviewees that participated in the two earlier research phases.

3.3.1 Participants

Participants were selected in order to form some criteria, with the most important of them being or have been at once students in an e-learning environment. The author had a strong background in e-learning, having participated in more than 5 e-learning environments from 5 different universities, so the initial list of participants was formed by students from University of Portsmouth, University West, University of the Aegean, LUT university and finally from people who have attended some e-learning courses offered by coursera or edx platforms.

In the first quantitative phase of the research, an online questionnaire was sent to students from different institutes. A total of 91 responses were received, with 56% of the participants being females and 44% males, most of them (90%) were citizens of the European Union and were attending engineering courses. During the second qualitative phase 10 participants from the above groups were randomly chosen, with 7 of them being men and 3 women. 3 of them were students of the West University of Sweden, attending a distance MSc in Robotics and Automation, 3 of them are attending a distance BEng (hons) in University of Portsmouth, 3 of them are attending e-courses in Coursera and edx while 1 is attending a distance Msc in Biorefineries in LUT University of Finland.

3.3.2 Quantitative Data Collection

As mentioned above, the phase of the quantitative data collection was the initial phase of the research. A number of 91 questionnaires were sent through e-mails to the participants, questionnaires that have been created with google form application.

Questionnaire had 21 questions (see Appendix A), almost all of them were close-ended and some of them had sub questions included, reaching the number of things being asked by the participant to fill to 28. Questions started with general information of the participant and mostly asked the participant to rate the level of social interaction that he/she had in the e-learning environment.

There were a variety of questions including Likert scale, nominal and rating ones. Through them the researcher wants to gain an understanding regarding the level of satisfaction that the participants had towards their e-course, the relationship that they are having with the other students, the teaching staff, the institution and their thoughts regarding the levels of social interactions in their courses.

3.3.3 Qualitative Data Collection

The qualitative phase of the research was implemented after the phase one ended. Based on the results collected by qualitative methods, the researcher reached some conclusions and formed a protocol of semi structured interviews (see Appendix C), to be carried out with 10 participants who have been randomly chosen from the initial group of 91 persons that fill in the questionnaires. Most of the participants had attending an e-learning course because it was obligatory for their studies, some attended some of the rapid growing e-learning platforms for courses (like edx and coursera), while some of them attend to e-learning courses due to the covid-19 crisis that banned the on campus learning activities for some period.

Due to the ongoing covid-19 crisis but additionally due to the fact that some of the participants were citizens from different european countries, all of the interviews were conducted through online sessions. Before the start of each interview, participants were asked to sign a form of consent (see Appendix B), the author explained to them the process and made a brief introduction regarding the topic that is being researched and guaranteed them that all the information and their answers will remain confidential and will be used only for the purposes of this study.

3.3.4 Prototype

The next phase of the research was the creation of the prototype to be tested by 10 participants, the same participants that were interviewed in the qualitative phase . The prototype was formed based on the data received in all the earlier phases of the research. Data analysis from quantitative research gives some basic guidelines that the prototype should meet and the data from the qualitative interviews added the functions that would meet the participants criteria, based on their answers. The prototype had to be designed as a plugin for an existing e-learning platform and e-learning platform “Moodle” was chosen.

3.3.5 Prototype evaluation

In the final phase of the research, the 10 persons that participated in the interviews, were asked to test the prototype in a web session, through their web browsers. During the test, the

author was observing them and taking notes based on their reactions, while the participants were asked to express themselves loudly, as part of the think-aloud protocol (see Appendix D).

A think-aloud (or thinking aloud) protocol is a method that is widely used in multiple fields including usability testing of products and services, in psychology and in social sciences. Think-aloud is a research method in which participants speak aloud any words in their mind as they complete a task, while the research is taking notes. Olson et al., (1984) in their report referred to think-aloud technique as one of the most effective ways to assess higher-level thinking processes.

The participants had to conduct 4 scenarios and finally due to the nature of the prototype (social media prototypes is based on physical reactions of other people) to navigate through the prototype freely, do every task they want, a process that would make the evaluation more valuable, since it will not be structured but it would mimitize a real one. The author was not supposed to guide the participants through the prototype however he helped when he was asked.

At the end of the evaluation the participants were asked 5 likert scales questions (see Appendix D) and they have time to express themselves the way they want and make any comment regarding the prototype.

4 Designing a social media plugin for existing e-learning platforms

This chapter focuses on each of the different stages that are required for the final creation of the prototype. The chapter includes all the steps that were made, from the initial sketches, till the mock ups and the interactive prototypes and from the name that was chosen for the prototype till the logo of the plugin. Additionally it makes a presentation of the functions that the prototype will include and present some screens from the plugin.

User interface field is considered as a crucial field that has attracted the interest of the design society in recent years due to its significance. In this study a lot of attempts have been given to the interface, the visual result and the aesthetic value of the final proposed solution. In contrary with what is used to happen in similar cases, the prototype was not created roughly in order to be tested and presented, but it was designed with respect to the aesthetic values of the participants that will be called to test it, in order not to just rate the potential of a prototype, but rate it as a solution that is ready to be released.

4.1 Branding

Many people consider branding as a supplement that only adds some extra value to the product and that it is something that is applied at the last phase of a production process and has nothing to do with the other phases, however this is completely false. According to (Neumeier, 2008) branding is the process of connecting good strategy with good creativity. The name, the colours and finally the logo that a designer uses in order to give identity to a product affect the final impression of customers regarding the product and can either destroy it or lead it to success.

The research was focused on the absence of the social aspects that occurs in e-learning environments and as stated at previous chapters, the final solution should have as a goal to represent a virtual courtyard of a e-learning platform that would offer to the distance learning the students most of the things that happened in a college courtyard, from discussions to development of friendship, to interactions with people from other countries, that have other

interests and more. For this reason, the name that was selected for the solution is “Proavlio” which in Greek (the nationality of the author) means “courtyard”.

“Proavlio” wants to bring to computer’s screens of the distance learning students the same feeling that a college courtyard had and made them feel like an active part of the education institution that they belong to. ”Proavlio” main goal is to bring closer people who are part of the same institutions but probably will never meet each other face to face, neither physically interact due to the nature of distance learning.

This main aspiration of “Proavlio” is also reflected in its logo, where two human figures , (which represent students of the e-learning platform) try to approach each other. The colour pallete that was used is presented along with the logo in the above figure.

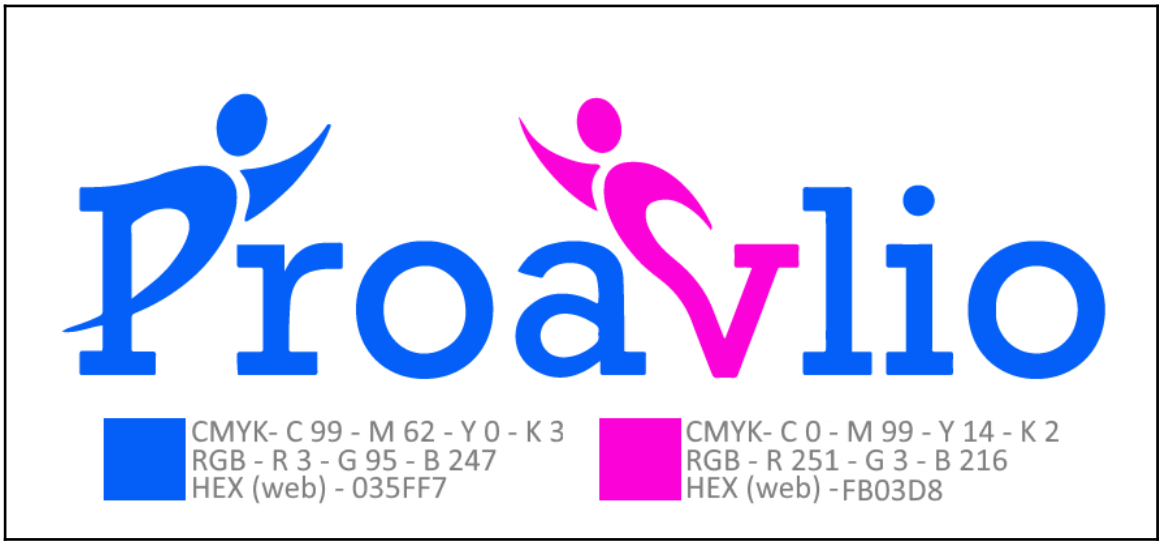

Figure 3. Logo of “Proavlio”

4.2 Prototype

Since “Proavlio” is not considered to be an independent social media network but a supplementary solution to be used by institutions in order to enhance distance student’s participation in social activities, the prototype had to be created as a plugin for an already existed e-learning platform.

Open source “Moodle” platform was selected, and this selection affected the main structure of the prototype, which followed many of the “moodle’s” attributes.

The design of the prototype was affected by the findings of the research and the data that the students involved in e-learning gave. The three more crucial outcomes that the author noted was that students did not feel as an active part of the institution that they belong ,that students did not evolve almost any social interaction with their classmates and their professors and finally that some of the students participating in a activity related with their programm faced some kind of abusive or racist behaviour, a behaviour that was difficult neither to be recorder nor to be communicated with the responsive staff of the institution. These findings formed the four main categories that the prototype focused on.

As a social media plugin, “Proavlio” should follow some core functions that the majority of social media has, such a “wall page” that each student and group should have and one timeline page where each new post related with the user preferences should appear. However, most of the other functions on the website were custom created as a solution to the problems mentioned by the participants in the research.

4.2.1 Prototyping process

Prototyping process included four main steps, from the depiction of the initial idea to the final interactive prototype. The four steps were the above

- Sketching
- Wireframing
- Mock up preparation
- Final interactive prototype

In the first step,the basic structure of the website was roughly created by hand sketching in order to decide how the components will be placed in the site and what should be included.

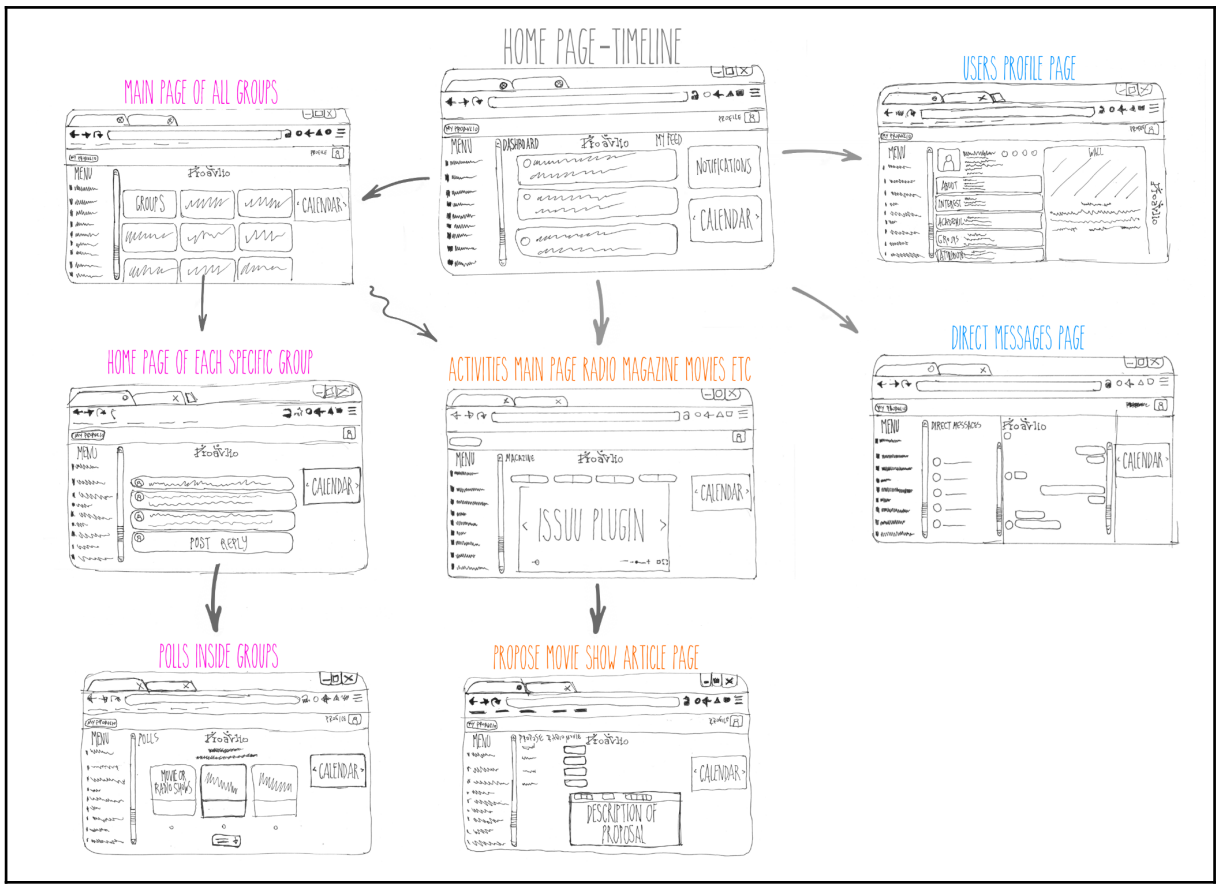

FIGURE 4. PROTOTYPE'S BASIC SKETCHES AND THE PROPOSED FLOW

Next the sketches were turned to more detailed wireframed ones, that set up the basic guidelines that the whole website should follow. Wireframes were also created by hand and watercolor were added in order to visually split some functions and options.

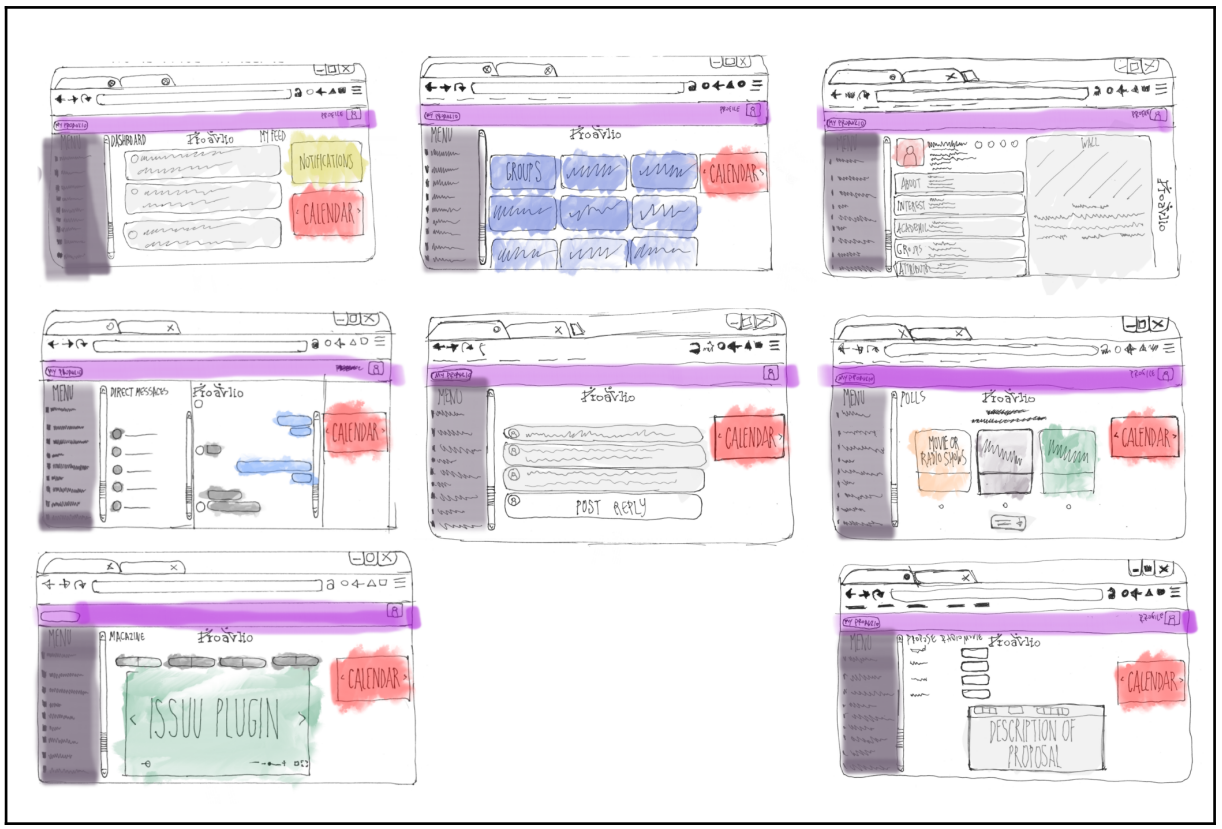

FIGURE 5. COLORED WIREFRAME SCREENS OF THE PROTOTYPE

The wireframe sketches were turned to mock ups, where by using adobe suite's softwares such as "Photoshop" and "Illustrator" the whole website was visually created and all the screens were built. This was the most crucial part of prototyping because based on the screens of the mock up, the prototype would be structured.

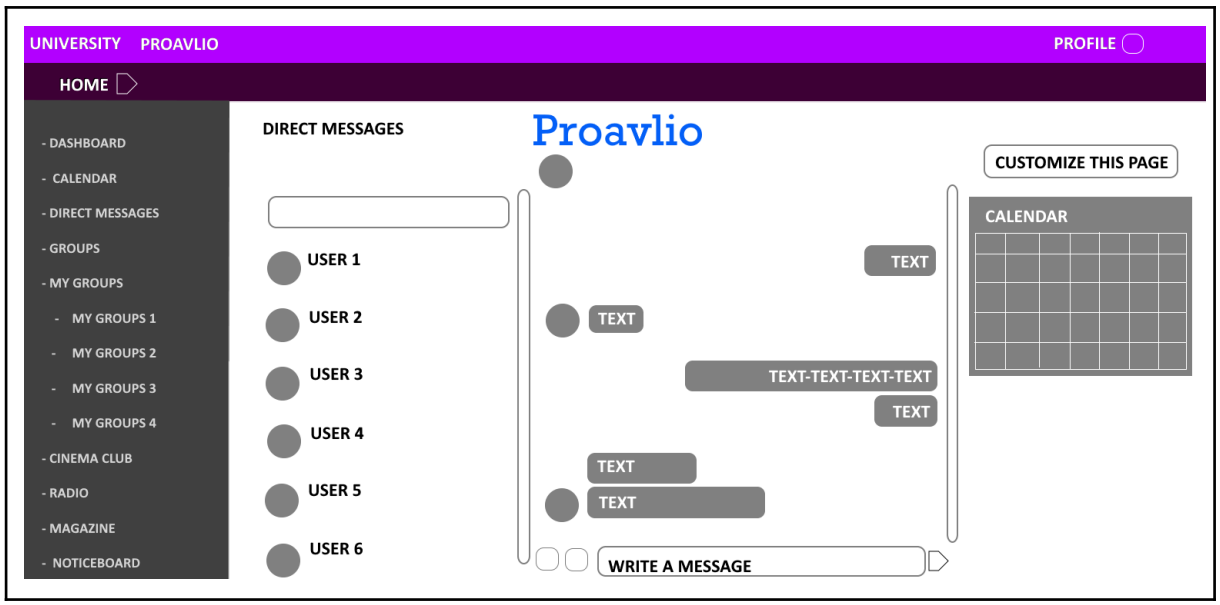

FIGURE 6. MOCK UP SCREEN OF DIRECT MESSAGES

Finally, through the axure software the sketches and the images were turned to an interactive prototype, a prototype that included all the possible actions that a used should made in the environment of "Proavlio".

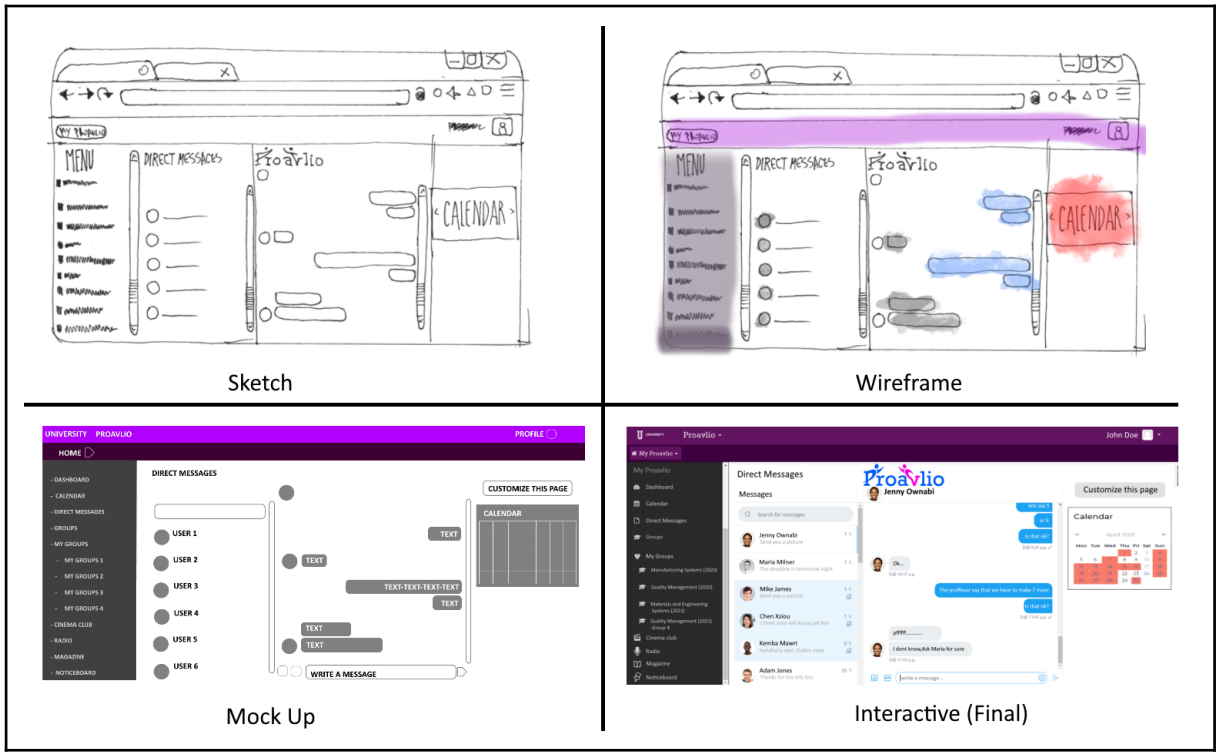

FIGURE 7. THE FOUR DIFFERENT PHASES OF A SINGLE PAGE (DIRECT MESSAGES)

4.2.2 Interface

The Interface of the “Proavlio” follow a basic type of interface that Moodle has, with an upper basic header line that has two main “options”, at the left side things related with the plugin itself and at the right side things related with the user account.

At the right side of the interface, there is the menu sidebar, that includes all the main components of the plugin, a sidebar that is part of every separate screen of the plugin. Each option of the given displays at the main window of the page, the content of the selected option. The whole action is being taken at the main window, where users can type messages, search for groups that fit them, participate in different activities and interact with classmates and teaching staff.

At the right side of the main window, there is a widget of a calendar that shows the main upcoming activities that either user or the group that the user has joined have.

Figure 8. Interface of proavlio

4.2.3 Functions

As mentioned above, except for the functions that all the social media have, the majority of the other functions of the "Proavlio" were created in order to solve the problems that the students in the e-learning environments are facing.

Probably the most obvious outcome of the research was that the majority of students feel that they did not evolve any social relationship neither with their classmates nor with the teaching staff, something that was highlighted in answers given in the questionnaires but also mentioned by most of the participants in the interviews. The "Proavlio" emphasizes on building social relationship through students with the option of direct messages between them. Additionally, the option of joining a group and chatting inside the group will boost their relationships.

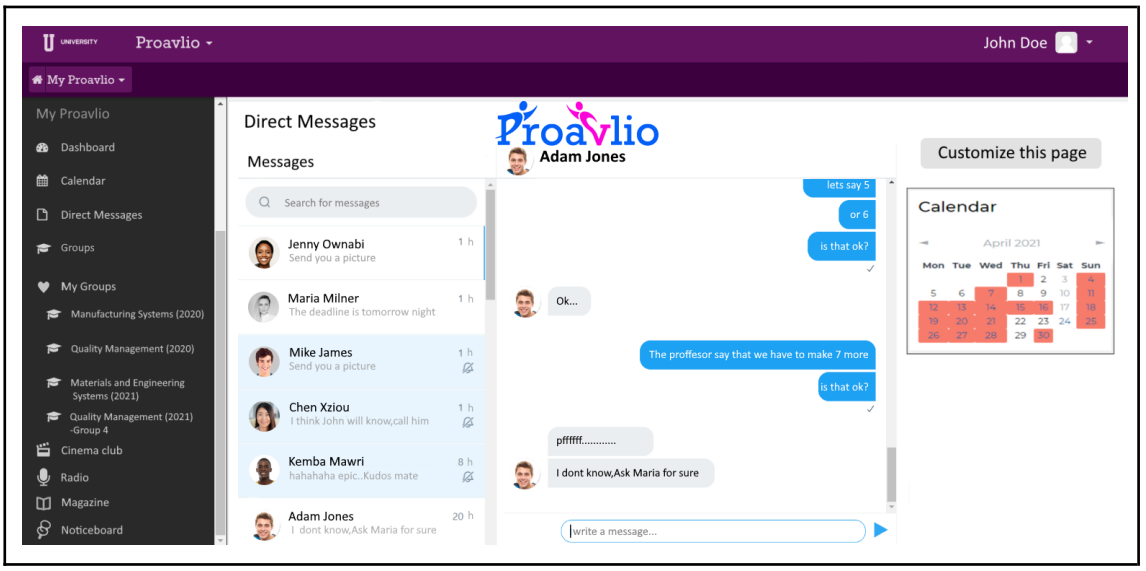

Figure 9. The section of direct messages

Last but not least, each student can publish in his/her profile page, his/her main interests, academic history, a small bio and some general data, something that could improve the selection of members for group assignments, something that was also mentioned by many participants as a problem.

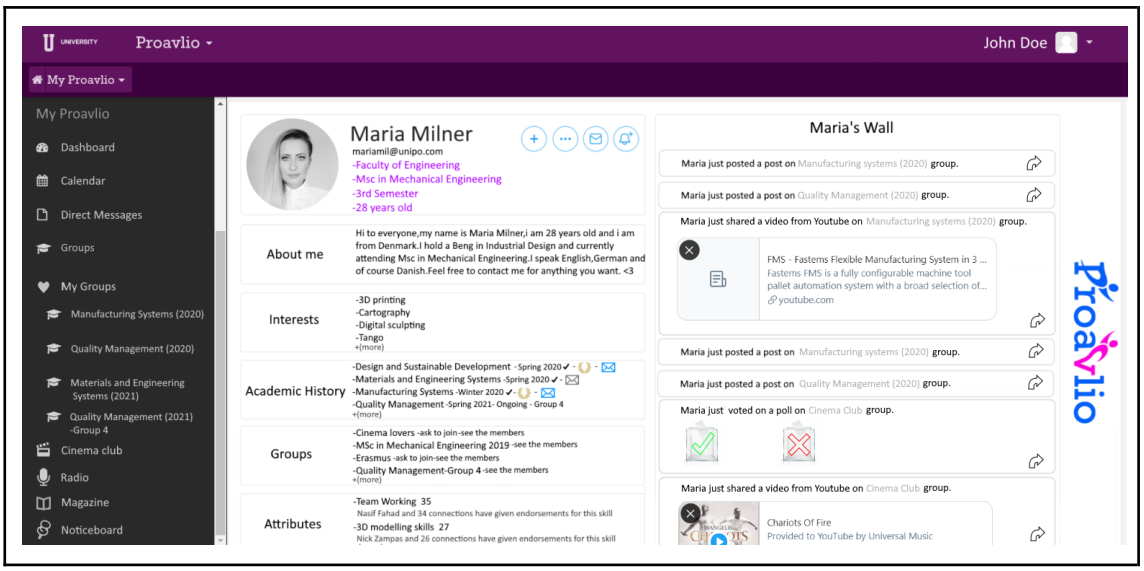

FIGURE 10.THE SECTION OF USER'S PROFILE

Based on the results, the students seemed to feel that they do not actively participating in the activities of the institution, while a large percentage believed that they are facing a different treatment in relation with the on campus students. As a solution to these problems two functions of the "Proavlio" tried to make the distance learner available to participate in two common activities that are often happened at campuses, this of a student radio station and of a magazine created by students.

FIGURE 11. MAIN PAGE OF "RADIO" PAGE

The field of participation into different activities was a difficult puzzle to be solved due to the nature of the e-learning environment where everything is made into the internet and without physical presence. An option of a group that will watch movies through zoom sessions was created, movies that will be proposed through forms and selected through polls, while both actions will be made by the students, something that will make them participate in an institution event even from the screens of their computers.

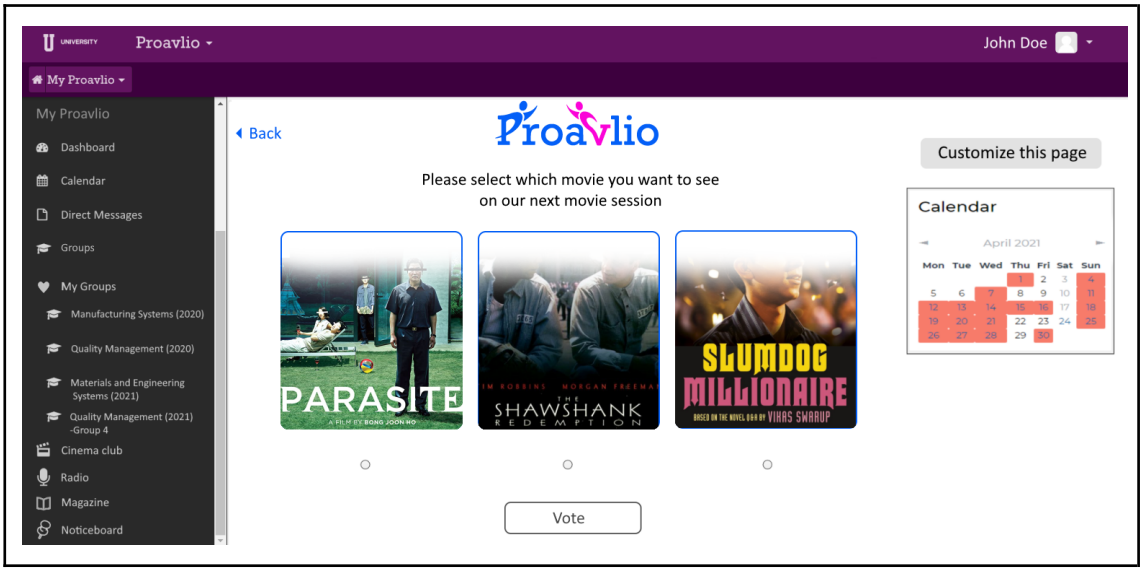

FIGURE 12. PAGE OF "POLLS" OPTION INSIDE MOVIE SECTION

Last but not least, a small percent of answers were related to racist or abusive comments and actions that some students faced. Students also mentioned that it was not easy to refer this incident to teaching staff. In order to avoid such situations, the "Proavlio" includes options for reporting a post or a message as abusive, reports that are immediately forwarded to institution. Likewise, the students will have the opportunity to report other students at their profiles and when a student will receive a large amount of reports, then the institution will be informed regarding the situation.

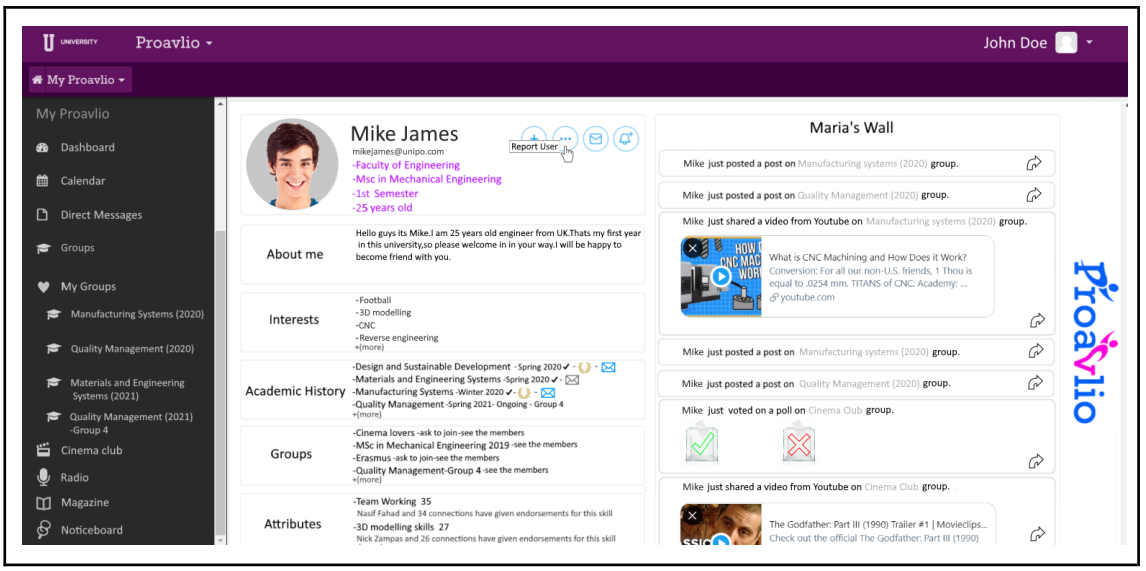

FIGURE 13. OPTION OF REPORTING AN USER'S PROFILE AS ABUSIVE

5 Results

This chapter of the study presents the results that were obtained through each one of the three different data collection phases. The order of the subchapters follows the order that the phases of the research followed, where in the first subchapter the quantitative phase will be analysed and the results will be presented through diagrams, charts and brief descriptions, in the following subchapter the outcomes from the qualitative phase will be presented.

Last,in the final subchapter will be presented the results that emerged from the evaluation of the prototype, both during the evaluation via a think aloud protocol and after the evaluation with the answers of the users in five likert scale's questions.

5.1 First Phase Results (Quantitative)

During the first phase of the research questionnaires were sent to students that are attending or have attended an e-learning course. A total of 91 questionnaires were answered, fulfilling the expectations of a high participation. The results present a specific trend, a trend that follows many of the answers, probably due to the fact that the selected group that the questionnaires were sent, was pre-selected and was meeting some same criteria, something that explains the shares of age and level of education, where the questionnaires were sent mostly to students participating into an online msc course, a course that is impossible for people under 15 to participate and it is rare for people over 45 to attend a msc degree.

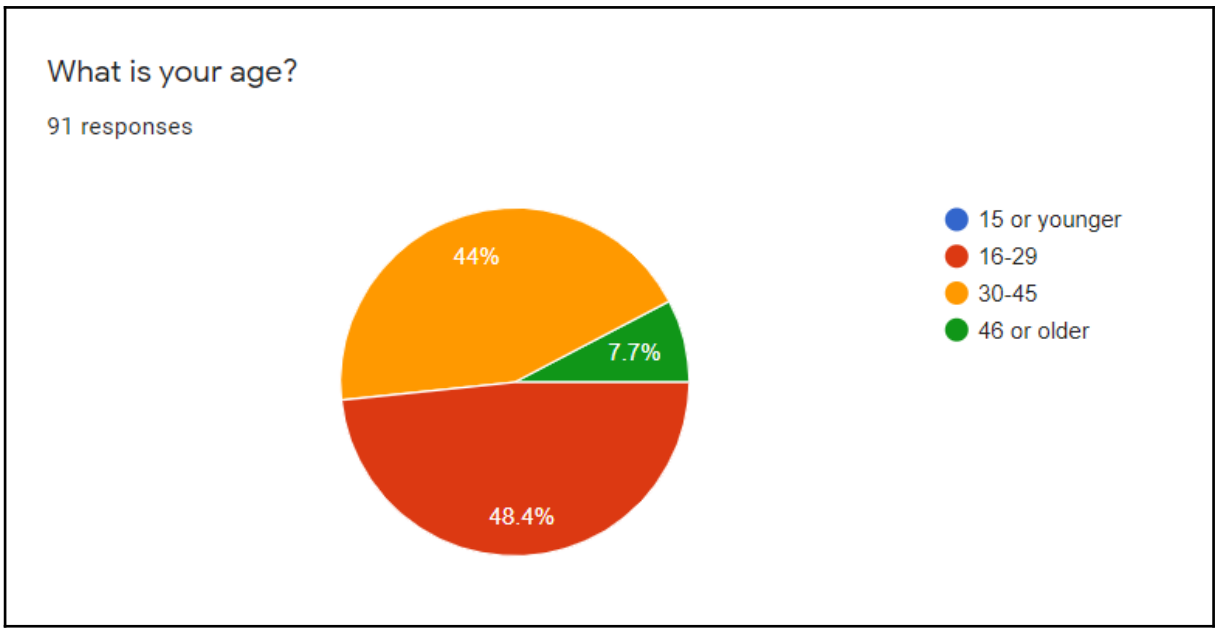

FIGURE 14. AGE DISTRIBUTION

The shares of gender followed a reasonable share, with 52.7% being women, 39.6% being men, 4.4% prefer not to say and finally a 4.2% identified as “other”.

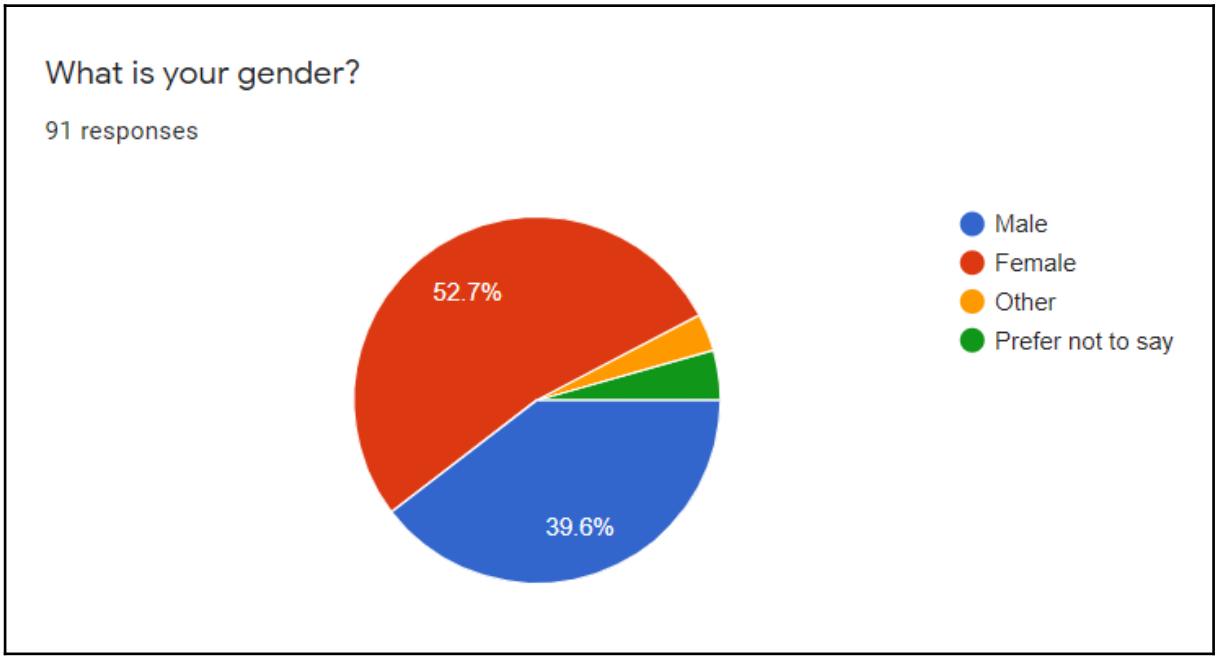

FIGURE 15. GENDER DISTRIBUTION

The results of the e-learning course level that the participants were attended present a strong trend as mentioned above, with the majority of 67% attended a postgraduate program, a share

of 19.8% a university program and 12.1% attended a e-learning course from an e-learning platforms such as edx or coursera. Finally a tiny percent of 1.1% stated “other” while no one was attending a program of first or second level education.

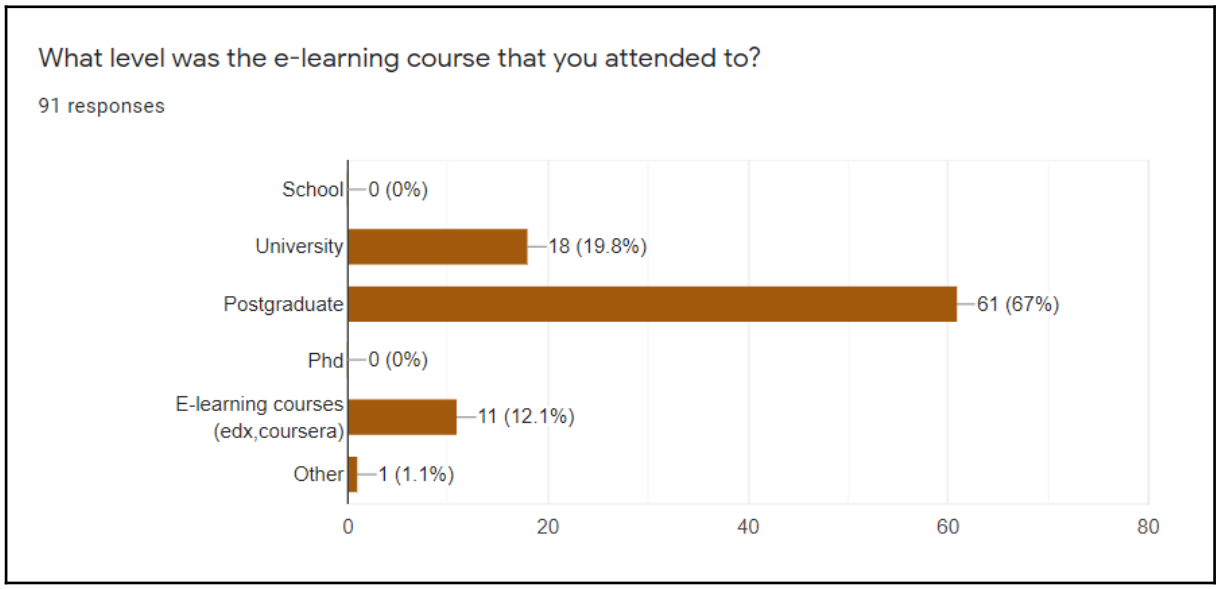

FIGURE 16. WHAT LEVEL WAS THE E-LEARNING COURSE THAT YOU ATTENDED?

The next two questions were introductory in order to gain a better understanding of the profile of the participants. The vast majority of them seemed to be experienced in e-learning courses with 34.1% having attended 10 or more e-courses and the 29.7% between 5 and 9. In the other graph we can see that most of the participants (69,2%) attended an e-course because it was an obligatory part of their course while a serious share (25.3%) switched to e-learning due to the ongoing covid-19 crisis.

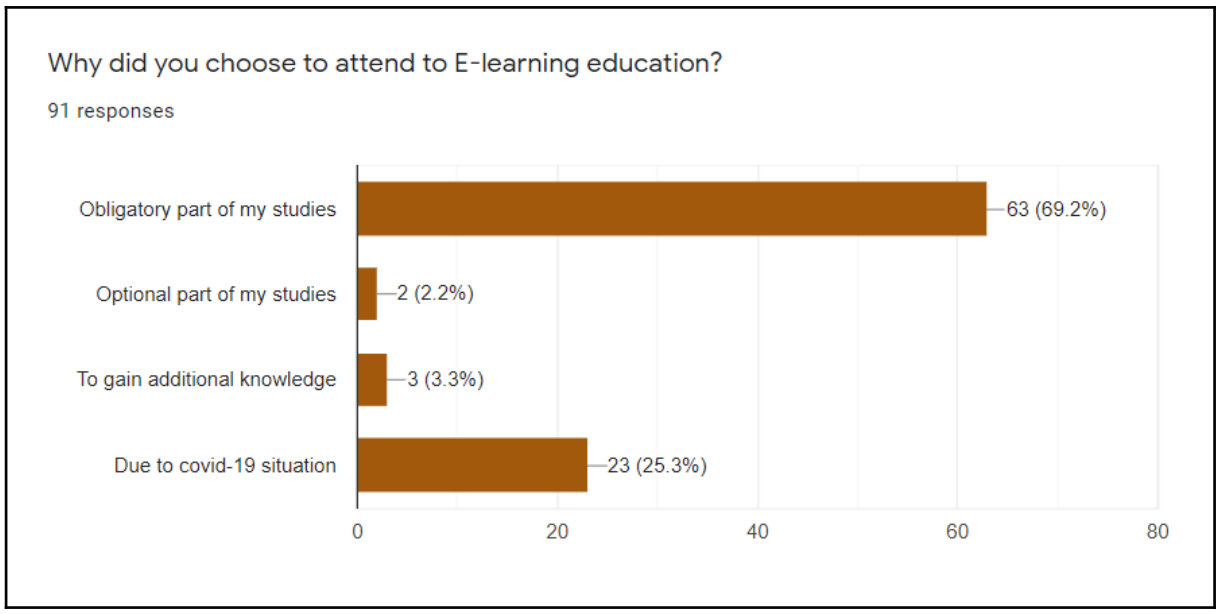

Figure 17. Why did you choose to attend E-learning education?

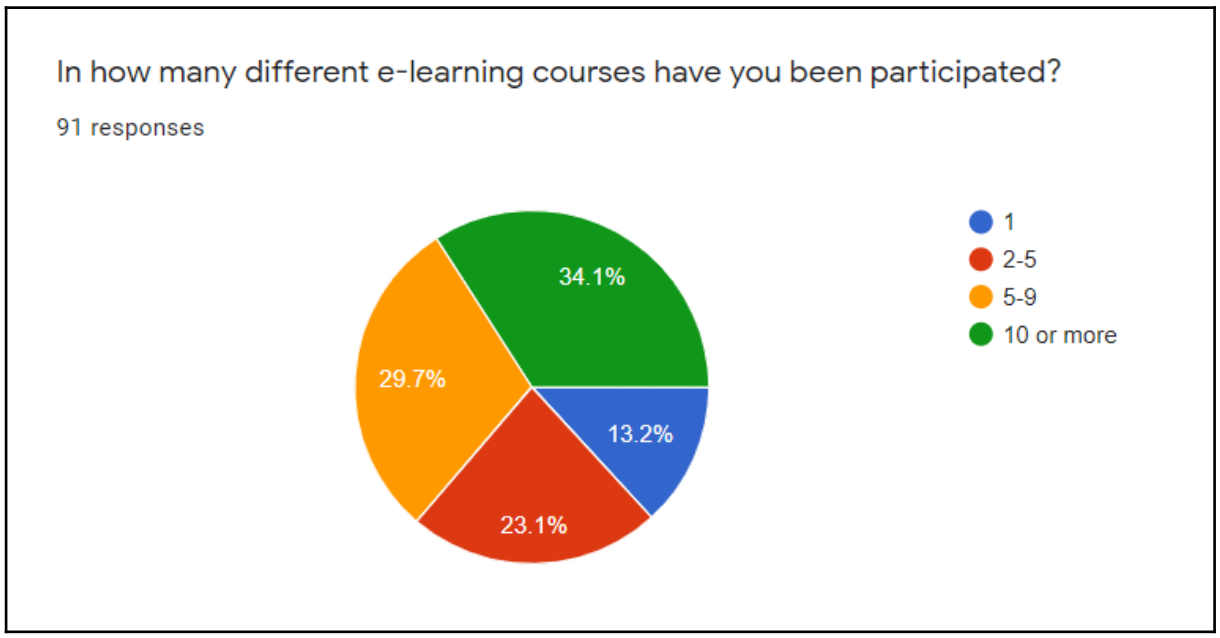

Figure 18. In how many different e-learning courses have you been participated?

The overwhelming majority of participants believed that the importance that their institutions paid in social interaction amongst students is among poor and fair. A small share believed that the importance was satisfactory and even few students rate it very good or excellent.

FIGURE 19. HOW COULD YOU RATE THE IMPORTANCE THAT THE COURSE WAS PAID TO THE SOCIAL INTERACTION BETWEEN STUDENTS?

A possible not expected result showed that 39.6% of participants answered that the percentage of group assignments in their courses was below 10%. However, this number can have an explanation due to the fact that in platforms like coursera or edx where some of the participants attend their courses, group assignments are not usual.

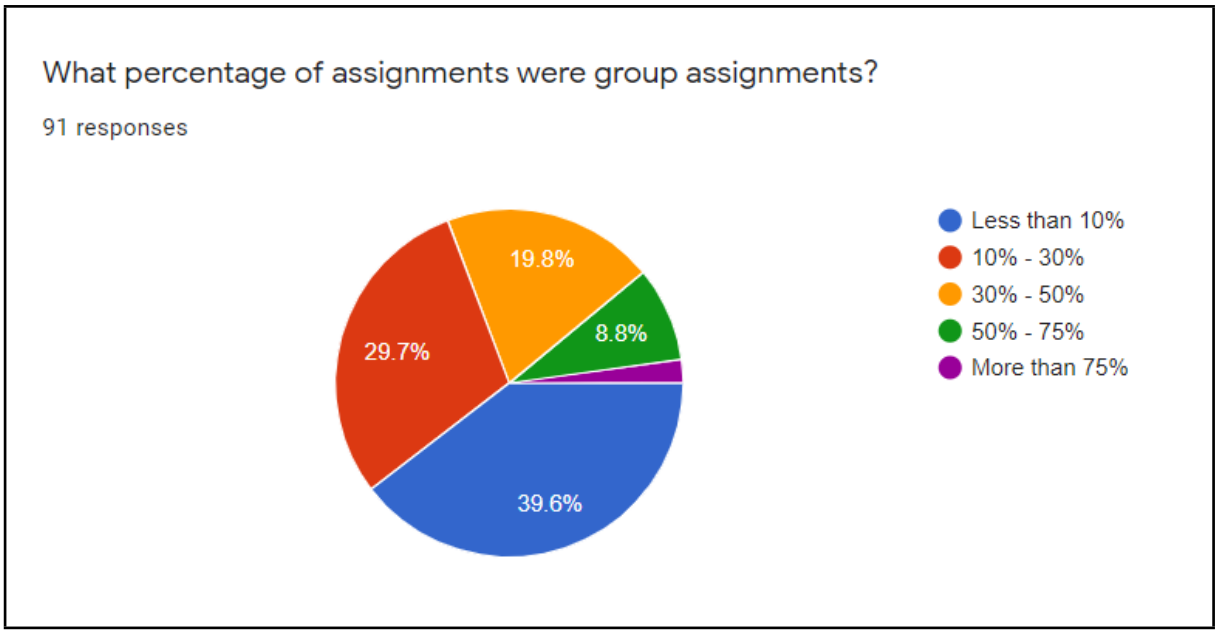

FIGURE 20. WHAT PERCENTAGE OF ASSIGNMENTS WERE GROUP ASSIGNMENTS?

Participants were asked to rate the relationship they have with their classmates, the teaching staff, the institution's personnel, and the institutions in general and the results showed that most of the students keen to have poor to fair relationships with all of the categories.

FIGURE 21. HOW WOULD YOU RATE THE RELATIONSHIP THAT YOU BUILT WITH PEOPLE INVOLVED IN THE E-LEARNING ENVIRONMENT?

The next three questions formed a group in which participants were asked to answer regarding the percentage, the level and the nature of the social interaction that they have with the other people that are attending the same course. The results were disappointing as the majority again showed that there is a deficit in social interactions.

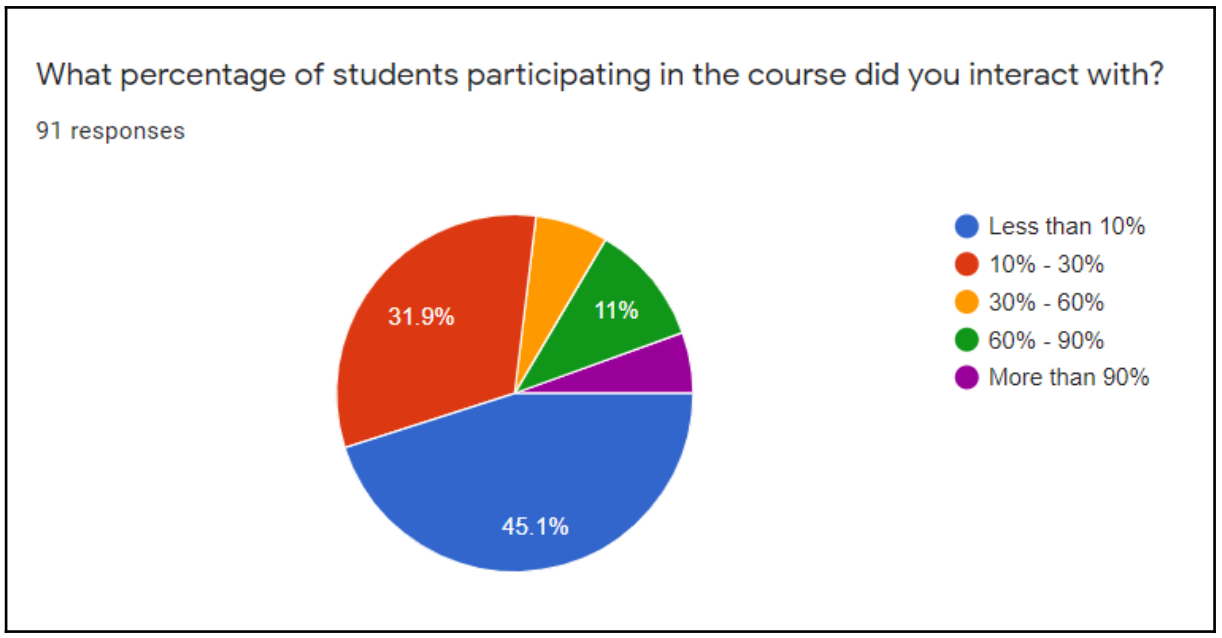

Figure 22. What percentage of students participating in the course did you interact with?

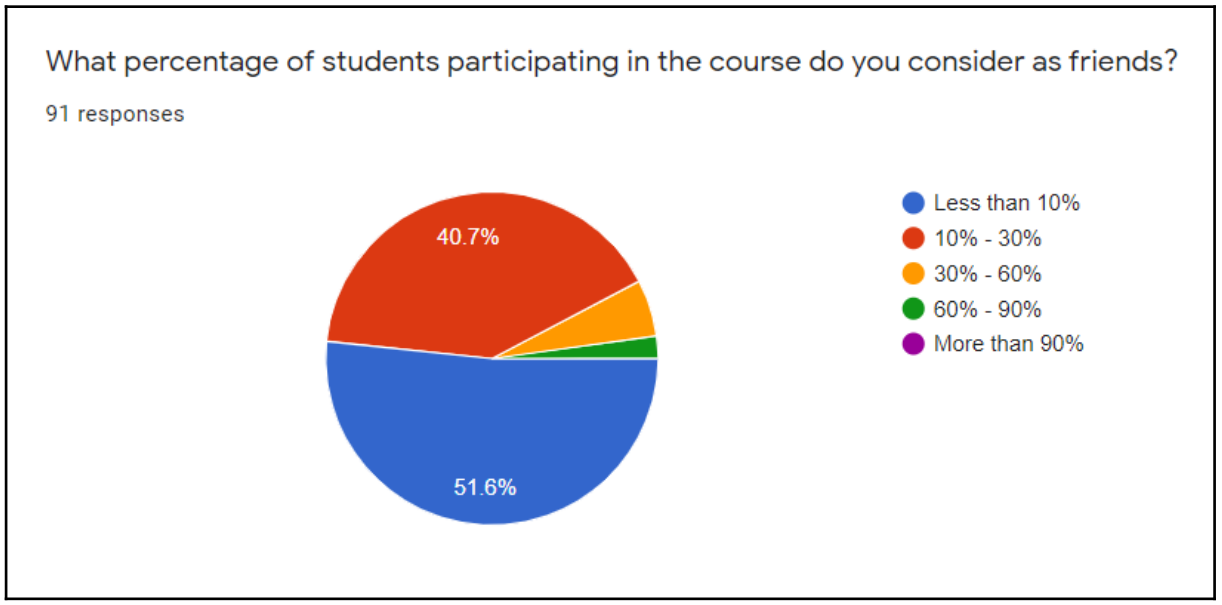

Figure 23. What percentage of students participating in the course do you consider as friends?

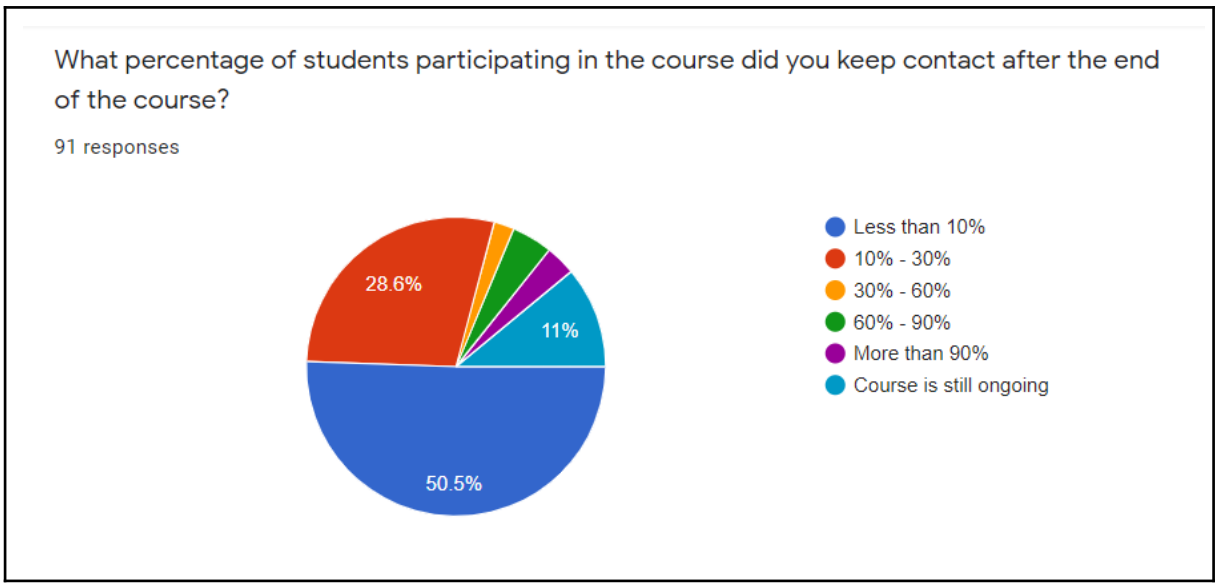

FIGURE 24. WHAT PERCENTAGE OF STUDENTS PARTICIPATING IN THE COURSE DID YOU KEEP CONTACT AFTER THE END OF THE COURSE?

A set of seven statements were presented to the participants and they have to declare their agreement or disagreement. The statements had to do with the importance of e-learning, the option that a student should have to select the students that will work together in group assignments, the way the universities treat campus and distance students and the existing situation of the tools that are used in order to boost social interaction in the field of e-learning.

The results continue to follow the trend of the frustration that students showed towards institutions and its efforts towards the improvement of social interaction. The vast majority of participants agreed that social interaction is crucial in a learning course and that E-learning platforms should increase the level of social interaction between students. Most participants believe that students should have the opportunity to learn some information regarding their classmates in the e-learning environments and that e-learning courses should encourage students to social interact with each other while in the statement regarding the way the universities treat on campus and distance learners the percentages are divided.

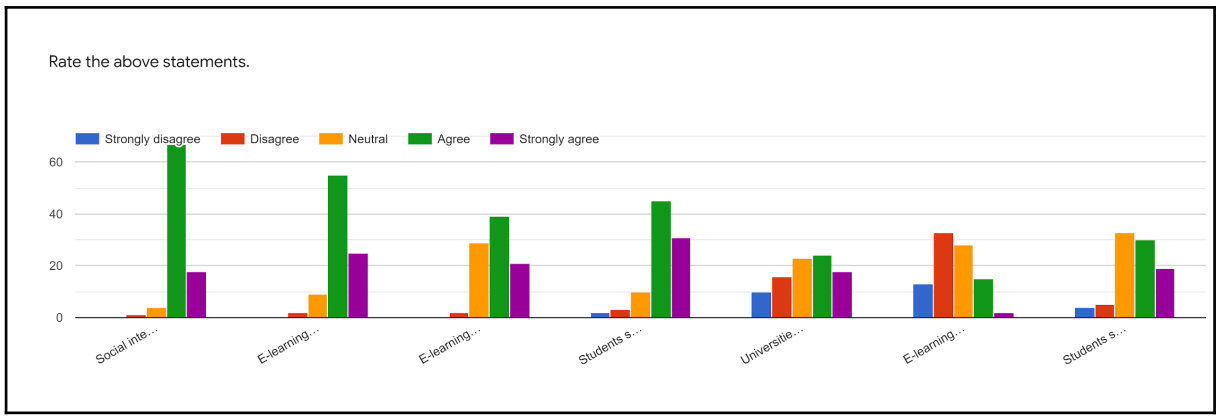

FIGURE 25. STATEMENT'S APPROVAL

The next two questions were about the level of engagement of the courses and the level of satisfaction that students have regarding the program they attend. The general trend of dissatisfaction that was a norm in the research seems to have changed in these two graphs where most of the participants found engaging their courses and even by small margin participants appeared to not disapprove of their courses.

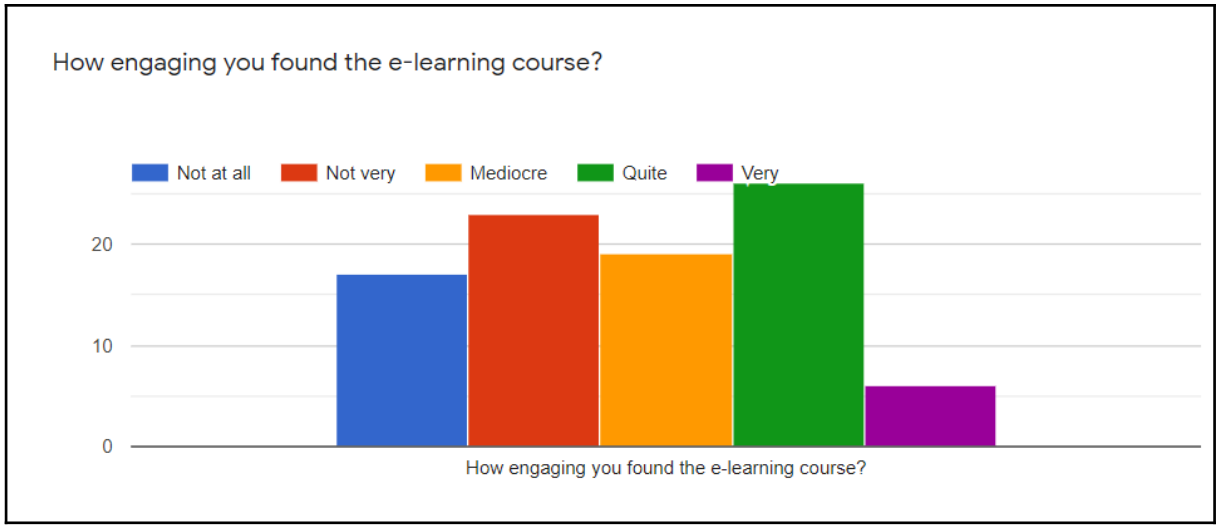

FIGURE 26. HOW ENGAGING YOU FOUND THE E-LEARNING COURSE?

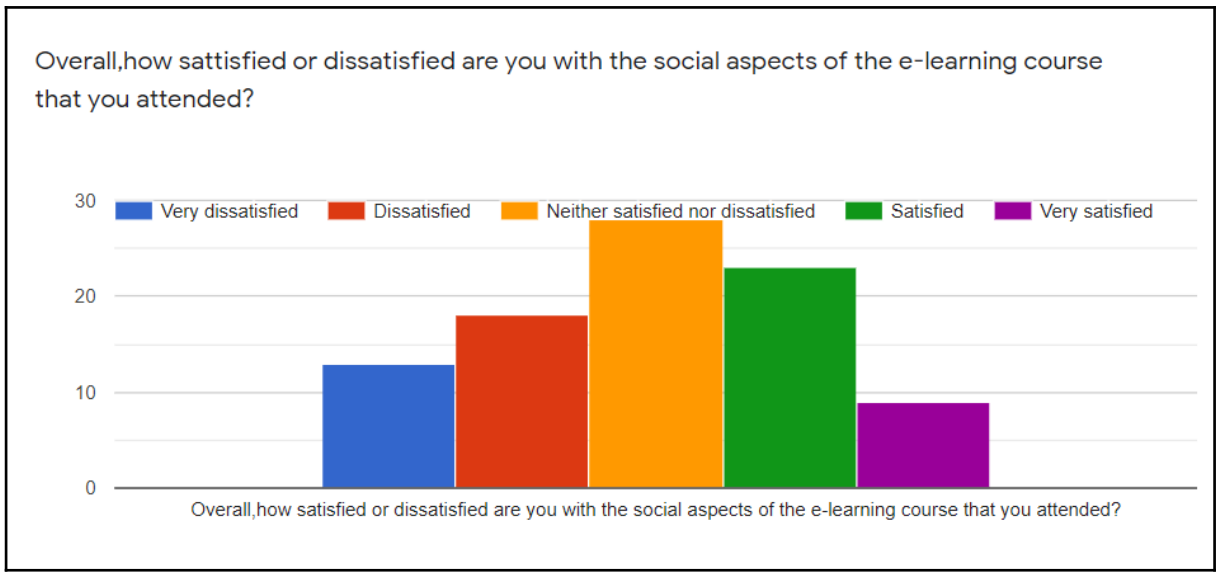

FIGURE 27. OVERALL, HOW SATISFIED OR DISSATISFIED ARE YOU WITH THE SOCIAL ASPECTS OF THE E-LEARNING COURSE THAT YOU ATTENDED?

A special question was placed regarding the possibilities of students continuing with e-learning even after the end of the covid-19 crisis and the return to normality. Despite the fact that the biggest share was in favor or re-attending an e-course, the results were divided.

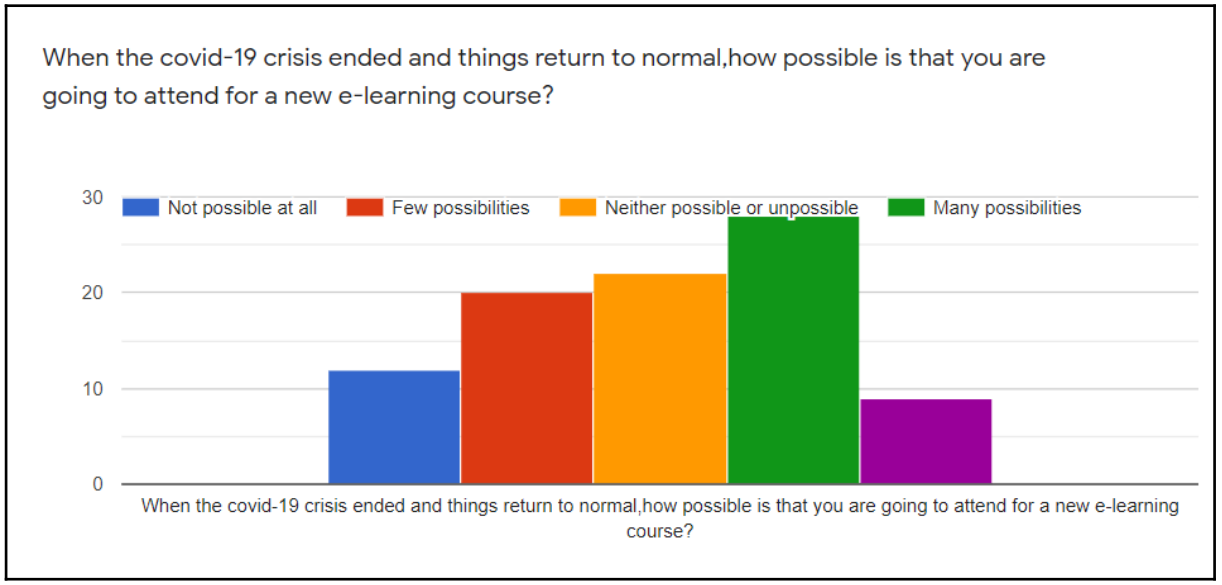

FIGURE 28. WHEN THE COVID-19 CRISIS ENDS AND THINGS RETURN TO NORMAL, HOW POSSIBLE IS IT THAT YOU ARE GOING TO ATTEND A NEW E-LEARNING COURSE?

Last but not least, an important group of questions were asked to the participants, questions that were asking participants if they have faced any type of abusive behaviours against them and if so, what type of behaviour was, who made it, who was the receiver and how easy was to get the officials of the institutions aware of the incident.

12.9% stated that they have noticed abusive behaviour in e-learning environments, a number that even if seems small however is worrying. Abusive incidents in learning environments should be of negligible quantity.

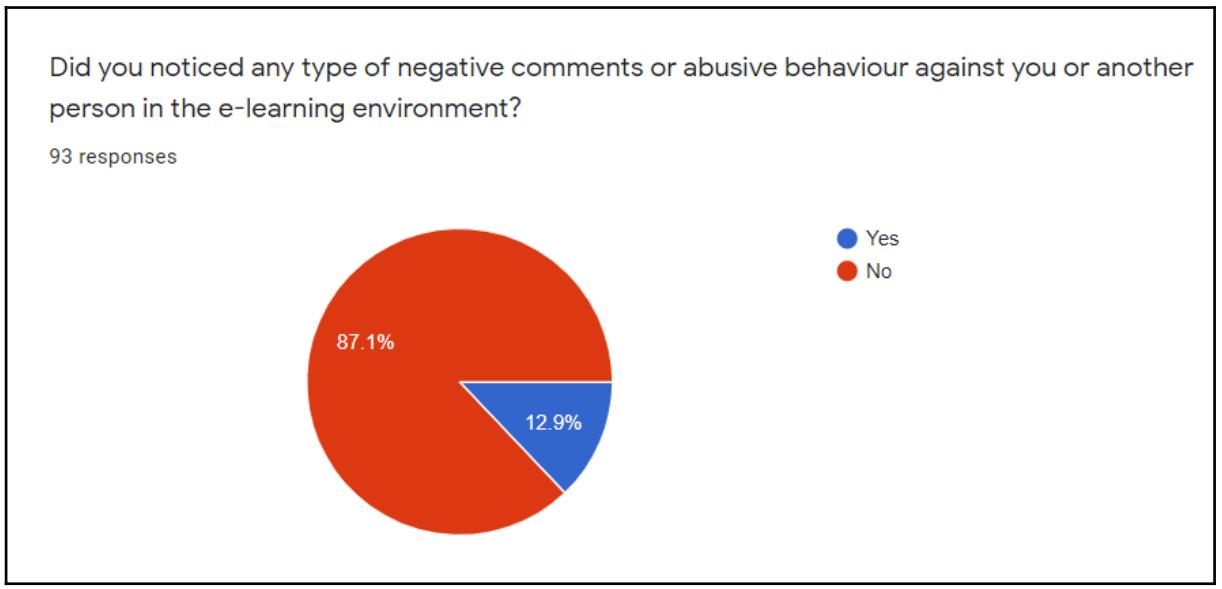

FIGURE 29. DID YOU NOTICED ANY TYPE OF NEGATIVE COMMENTS OR ABUSIVE BEHAVIOUR AGAINST YOU OR ANOTHER PERSON IN THE E-LEARNING ENVIRONMENT?

Two were the main categories that the negative comments or the abusive behaviour were related to, religion and race, age, sex, gender identity and nationality to share the same amount of 10%.

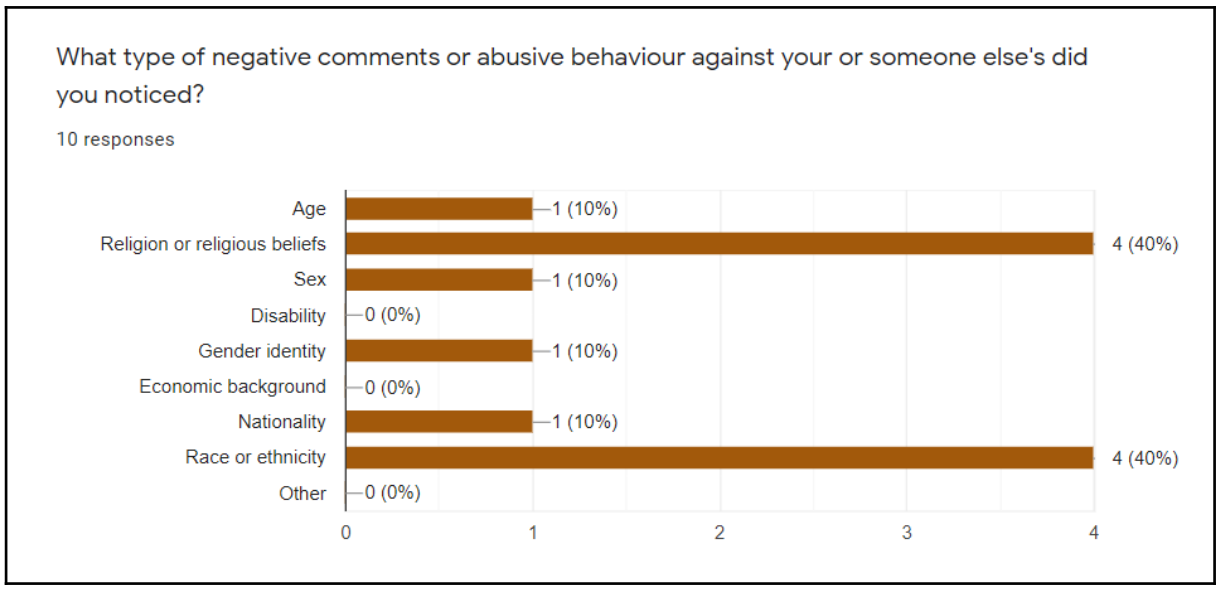

FIGURE 30. WHAT TYPE OF NEGATIVE COMMENTS OR ABUSIVE BEHAVIOUR AGAINST YOU OR SOMEONE ELSE DID YOU NOTICE?

The overwhelming majority of comments were directed to the participants themselves, while the 90% of these abusive behaviours to be conducted by students.

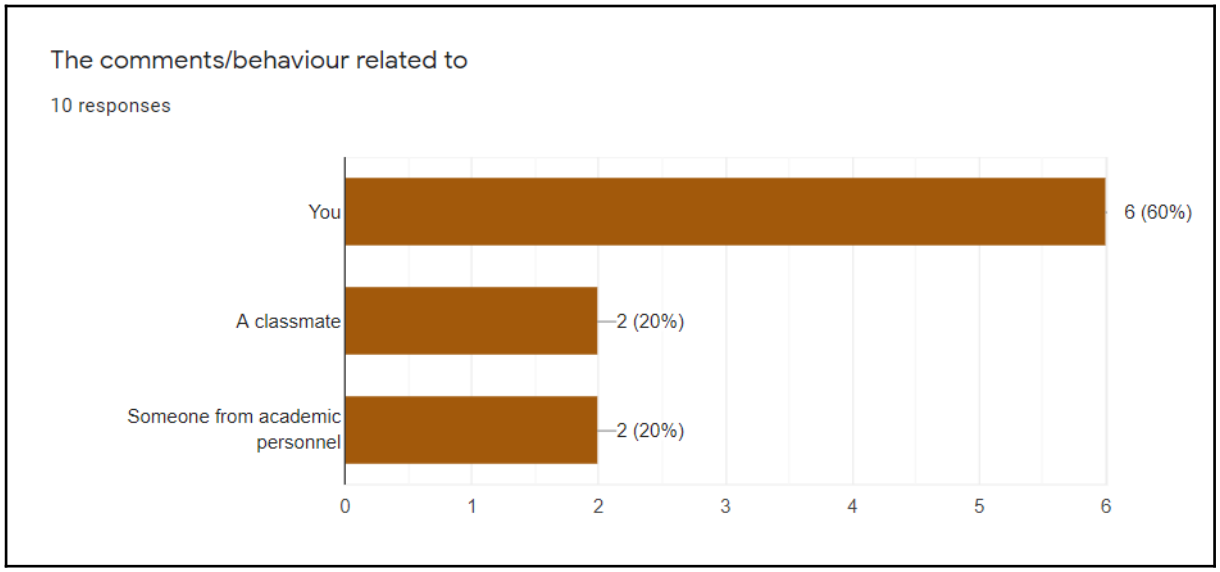

FIGURE 31. THE COMMENTS/BEHAVIOUR RELATED TO

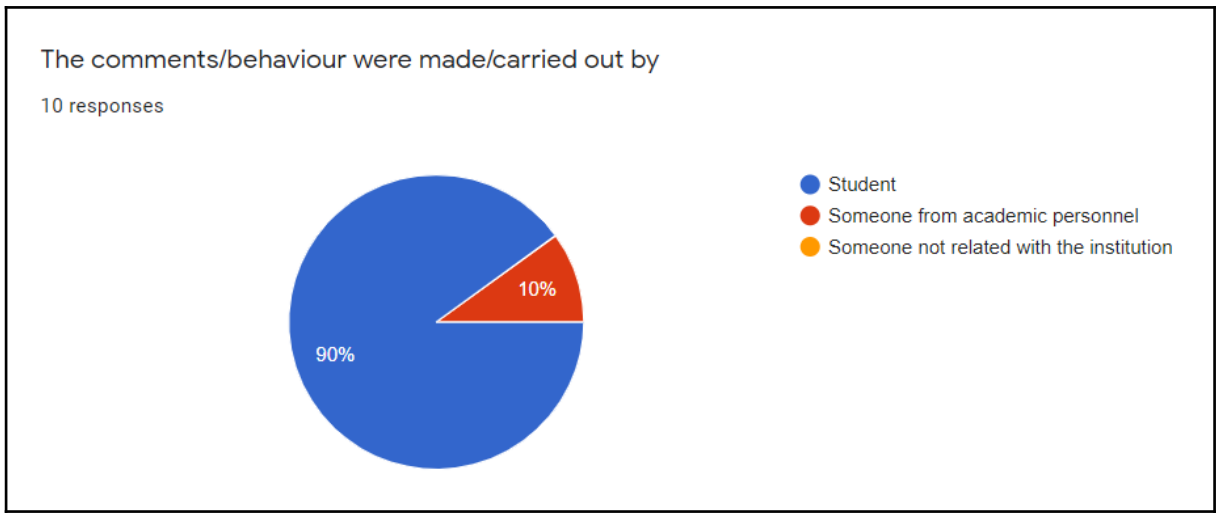

FIGURE 32. THE COMMENTS/BEHAVIOUR WERE MADE/CARRIED OUT BY

The final part of the questionnaire was about the level of difficulties that the students that noticed an abusive behaviour faced in order to inform the institutions about it. Half of the participants found it either difficult (40%) or too difficult (10%), a share that highlights the isolation that e-learners face in relation with their communication with their institution.

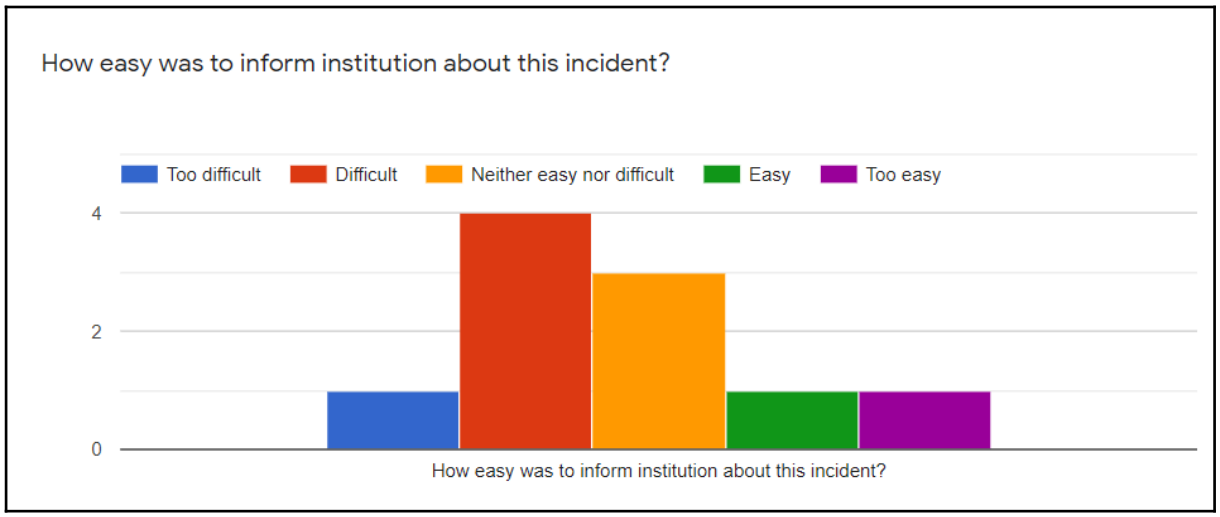

FIGURE 33. HOW EASY WAS IT TO INFORM THE INSTITUTION ABOUT THIS INCIDENT?

5.2 Second Phase Results (qualitative)

In this second phase of the research, ten participants from the initial group of the 91 that responded to the questionnaire were randomly selected and asked to have a brief interview in which they would have to answer 10 questions, questions that were created based on the findings of the first phase.

Due to the preselection of the participants, the typical part of the introductory questions that are asking personal information from the participants were skipped and the ten questions were more to the point of the topic discussed. Participants were asked to further analyze the outcomes of the first phase and to present their ideas and proposals regarding the improvement of the social interactions of students in the e-learning environments.

The trends from the first phase remained the same, where most of the participants declared that they feel isolated from the institutions and whatever takes place at it and highlighted the fact that institutions either do not pay attention to social interaction of students or that the existing tools that target the social interaction of e-learners are not enough. Participants' answers were analyzed through thematic coding in Nvivo software and the main outcomes are presented in the figure 34 where participants' attitude and thoughts towards some factors has been measured.

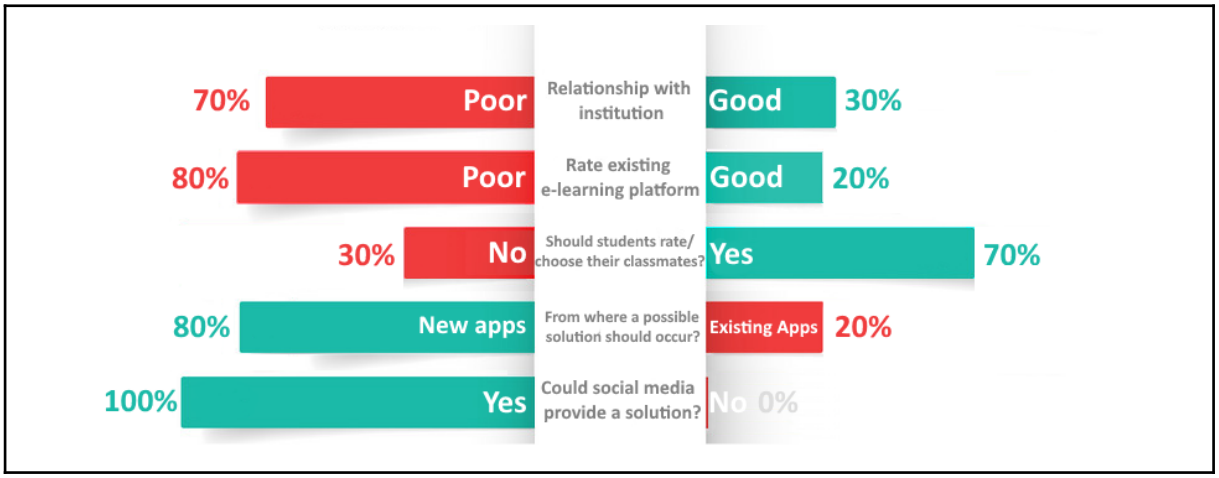

Figure 34. Analysis of participants answers based on coded topics through NVivo software

At the question “Do you feel that your institution is treating you differently in relation to campus students?” students seemed again (something happened also in the first phase) splitted, giving answers from different angles, however almost anyone seemed concerned regarding the topic. Additionally, the majority of the participants agreed that there is a problem in the relationship between students themselves or students toward teaching staff, with some of them stating that it is not a problematic situation but for sure there are a lot of things to be improved. The main topics that were mentioned in the interviews were presented in figure 35 where a word frequency query presented the terms and words that were mostly used by interviewees.

Figure 35. Word frequency query result from nvivo software

Finally, a large percentage of the questions was designed in order to make participants declare what they believe could be a solution towards our problem, with some questions being directed like “How would you consider a specific social media application that will be used only for socializing for university reasons?” while other questions were more indirected and had a target to make the participant think about the future of the field and propose some ideas like “The problem of socialization should be solved through existing solutions provided by universities or throughout something new?”.

The participant feedback was way too helpful however it was not so clear. It gives the basic guidelines that were needed for the solution to be made, expresses the main trends and shares the same beliefs but with no further analysis and without proposing specific things. All the participants agreed that socialising through social media could boost the relationship between e-learner however they believed that an extra social media platform will be too much for them, since everyone had at least 2-3 social media for other reasons. This creates the idea of a "social media style" plugin that will be used in the existing e-learning platforms and would be part of them as a booster of social interactions of students.

In the question "Should the students be available to rate (either positive, or negative) his/her classmates? Does this action may have a positive effect on social relationships between students or it will worsen the situation?" participants mostly agreed that it would be valuable to have the opportunity to rate their classmates however they appeared unsure regarding the effect that this action would have, mostly due to the fact that they were afraid if this action could be visible to their classmates. These doubts create the idea that was implemented in the prototype and in which each user could rate positively a classmate and this could be visible from the other classmate, however students could also report other students for abusive or racial behavior but this could be visible only by institution staff in order to take supplementary actions when needed.

Finally, the vast majority of the interviewees share the belief that e-learning courses should become more engaging and have some components of entertaining the participants in them, a belief that adds some possible options for the prototype that was under construction.

5.3 Prototype evaluation

The final phase of the research was the evaluation of the interactive prototype that was designed based on the answers and the feedback that the participants gave in both of them two data collection rounds. The prototype was created in Axure software, was an interactive one and it has activated almost any of the given options for the user to choose.

The final prototype was named “Proavlio” and it was a plugin for the existing e-learning open source platform “Moolde” that would act as an in-site social media platform for the students and the teaching staff of the institution.

Aa mentioned many times in the above chapters, everything in this prototype, from the initial idea, to the structure, the main functions and even to the more “useless” option were created according to participants' thoughts, ideas, recommendations and proposals.

The participants that took part in the prototype evaluation were the same ten that were interviewed and part of the first batch of 91 that were filled in the questionnaire, something that means that these 10 had a crucial role to the whole research and since the prototype was created based on their answers, their reaction towards the prototype evaluation will judge the quality of the final result. If their reactions were problematic, then the prototype will have failed.

Each user was asked to complete 4 tasks from 4 different scenarios in order to evaluate the prototype from all of its perspectives. The author observed users and took notes, helped them if they faced any problem and when the participants finished all the tasks encouraged them to further navigate through the prototype and freely evaluate it.

5.3.1 Scenario 1

In this scenario the participants are asked to navigate through the website, select a profile of a student (there are multiple way to do it so) and flag the profile as “abusive content/behaviour”

This scenario was chosen by all of the participants. The participants like the option that they had to flag someone for a subjected abusive behavior. However the majority of the participants got a problem to identify which user to flag and from which “pool” to select, with many of them having in their minds the option that most of the social media platforms had where the user have a list of followers/friend etc, something that is not happening in

“Proavlio” due to some limitations that were placed in order to avoid a split between the “cool” or “famous” students versus the students that do not have the asset of socialization.

Table 3. Script analysis of think aloud method used in scenario’s 1 task

Theme	Transcript
Concept	“Really interesting” “This could save people from a lot of “uncomfortable situations” “Something that was had to be obligatory to all universities sites”
Difficulties	“Does the user supposed to have a friends list?” “From where do i suppose to choose one?” “I can choose anyone?” “I don't know where to look to be honest”
Suggestions made	“A “search for students” button in each group will make it much easier”
Doubts	“I am worried that if for example,in one assignment i don not cooperate well with a team,then maybe the team wants to harm me by flag my profile and creating me a problem,difficult but possible”

5.3.2 Scenario 2

In this scenario the participant had to navigate through “Proavlio” found the main menu of the existed groups and choose one group to join.

This scenario was probably the one the participants found less interesting and failed to impress them. Participants found it easy to implement the task, did not seem to enjoy it and did not consider it as something different from other existing options that e-learning platforms offer.

Table 4. Script analysis of think aloud method used in scenario’s 2 task

Theme	Transcript

Concept	“OK” “Not something different” “I believe this option exist more or less in all platforms” “Nice fact that you can select group according to your interests” “A nice option but it is widely used”
Difficulties	-
Suggestions made	“If the groups were divided in categories,some that are for courses,other that are based on interests and other that are for group assignments it would be more interesting” “Something must be added,i do not know what but now it is just a usual group option”
Doubts	“Sometime the students may ask to create their own groups,create groups regarding politics or sports and then the things goes wrong”

5.3.3 Scenario 3

In this scenario the participants were asked to navigate through the “Proavlio” found the radio group, entered it and propose a new radio show to be included in the radio programm list.

At this scenario the participants appeared curious to implement it with almost all of them being impressed by the option of an e-radio that will be managed and used by the e-learners of the platform. The process was too easy and no one from the participants found it difficult to complete this task, mostly due to the vertical sidebar at the right side of the website that includes all the main components.

Table 5. Script analysis of think aloud method used in scenario’s 3 task

Theme	Transcript
Concept	“Perfect” “Great idea” “Interesting and funny”

	“The concept of a university radio that will bring distance learners from different countries to cooperate for a radio show is epic” “By far the best thing on the prototype” “Probably will have some difficulties in order to operate but great idea” “Unusual but cool”
Difficulties	
Suggestions made	“An option for Podcast is must” “Podcast” “You should add an option for Podcast,there are a global trend this period”
Doubts	“Maybe there will be problems regarding who will have the opportunity to have a show..the hours that a radio show is playing are limited and the students of an institution,especially when this institution is having distance learning options are numerous”

5.3.4 Scenario 4

During this scenario, the participants had to find the cinema group, enter it, find the “polls” entity and vote a movie from the given ones in the poll.

Participants were again faced with no problem to complete the task, with the vast majority of them doing it in a very fast manner. This happened due to the same structure that the prototype has and the scenarios “Propose a new radio show” and “Vote on a poll in the cinema group” were considered to be the same philosophy. Participants enjoy the idea of a cinema club where the students would organize movie nights through zoom sessions and that the choice of the movies will be a student’s issue.

Table 6. Script analysis of think aloud method used in scenario’s 4 task

Concept	“Epic” “Cool” “Nice” “Radio,cinema,magazine...all the assignments will be overdue haha”

	“Polls are nice concept where large group of people have to take decisions”
Difficulties	
Suggestions made	“Create a “youtubers” option where students will propose their personal videos to be displayed by the “Proavlio” youtube account,it will be cool” “The concept of polls should be added in all the options of “Proavlio”
Doubts	“The selection of the movies by students could be risky” “Doubt the successfulness of it”

In the last part of the evaluation session the participants were asked to answer 5 “Likert scale” questions regarding their experience with the prototype.

Eight out of ten interviewees stated that “Proavlio” can possibly affect the level of students’ social interaction in an e-learning platform with the two remaining participants neutrally support this statement.

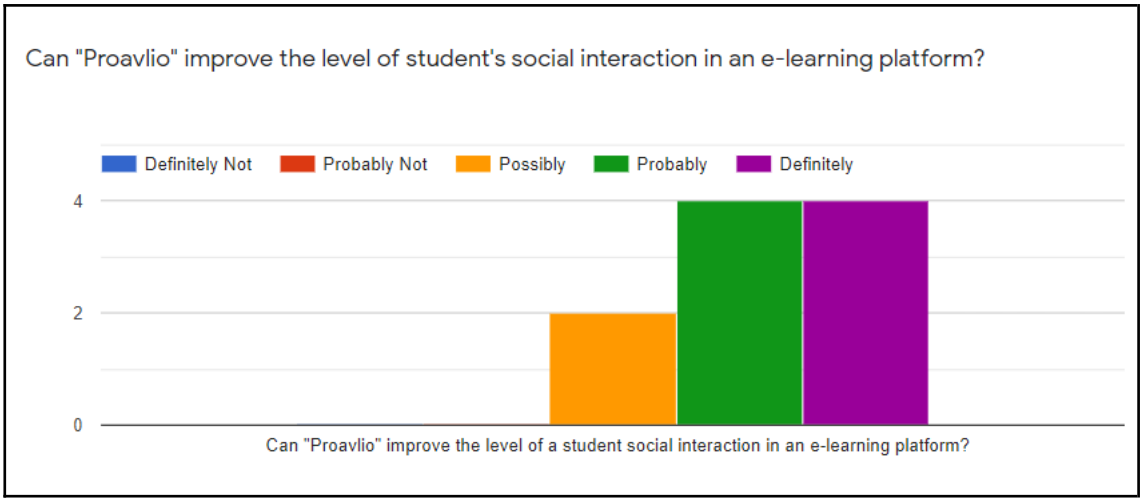

FIGURE 36. CAN "PROAVLIO" IMPROVE THE LEVEL OF STUDENT'S SOCIAL INTERACTION IN AN E-LEARNING PLATFORM?

In the question “If "Proavlio" was included in your institution e-learning platform, how possible is to make you feel more "active" member of the institution's community?”

participants again reacted positively, and the majority stated that Proavlio has many possibilities to make them feel active members of institutions society.

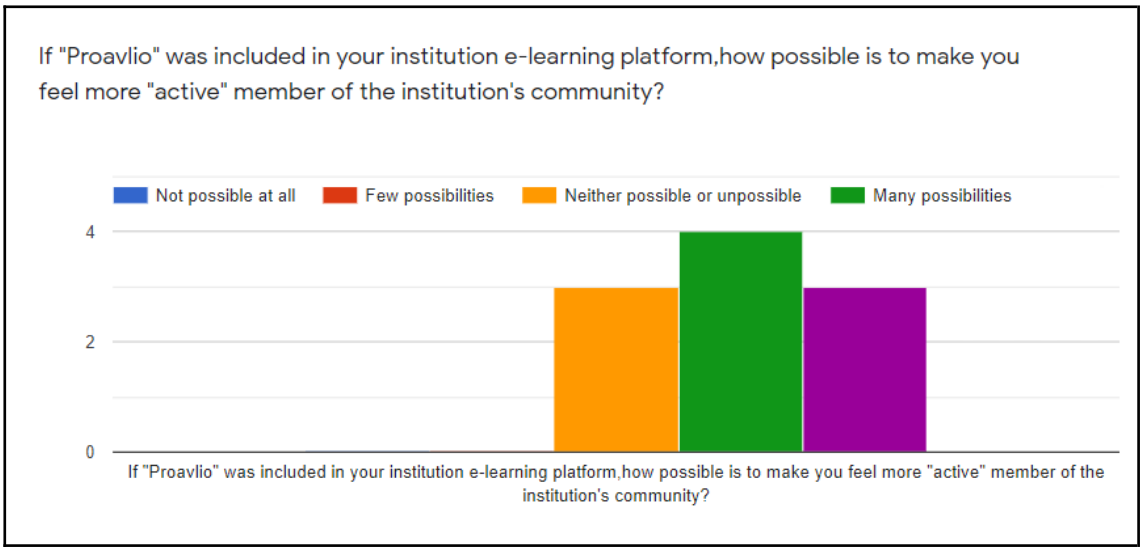

FIGURE 37. IF "PROAVLIO" WAS INCLUDED IN YOUR INSTITUTION E-LEARNING PLATFORM,HOW POSSIBLE IS TO MAKE YOU FEEL MORE "ACTIVE" MEMBER OF THE INSTITUTION'S COMMUNITY?

When the participants were asked to comment on the statement “If "Proavlio" was included in your institution e-learning platform the e-learning experience would be more engaging.” Eight of them either strongly agreed or just agreed, while one was undecided and one disagreed with the statement.

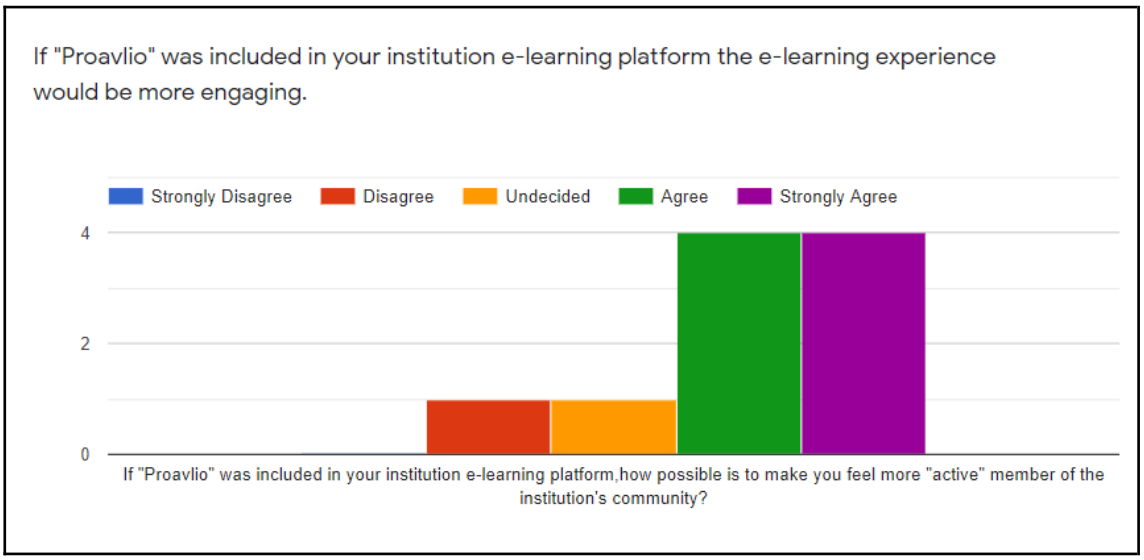

Figure 38. If "Proavlio" was included in your institution e-learning platform the e-learning experience would be more engaging.

The next question was the one who divided most of all the respondents, probably due to its hypothetical nature. More specifically the question stated “If "Proavlio" was included in your institution e-learning platform what percentage of students participating in your course, do you believe that you could possible consider as friends?”

Three participants answered that in this hypothetical scenario would consider 60-90% of classmates ase their friends, two answered that they consider over 90% of classmates as friends, while the other five participants shared among the other three categories 30%-60%,10%-30% and finally less than 10%.

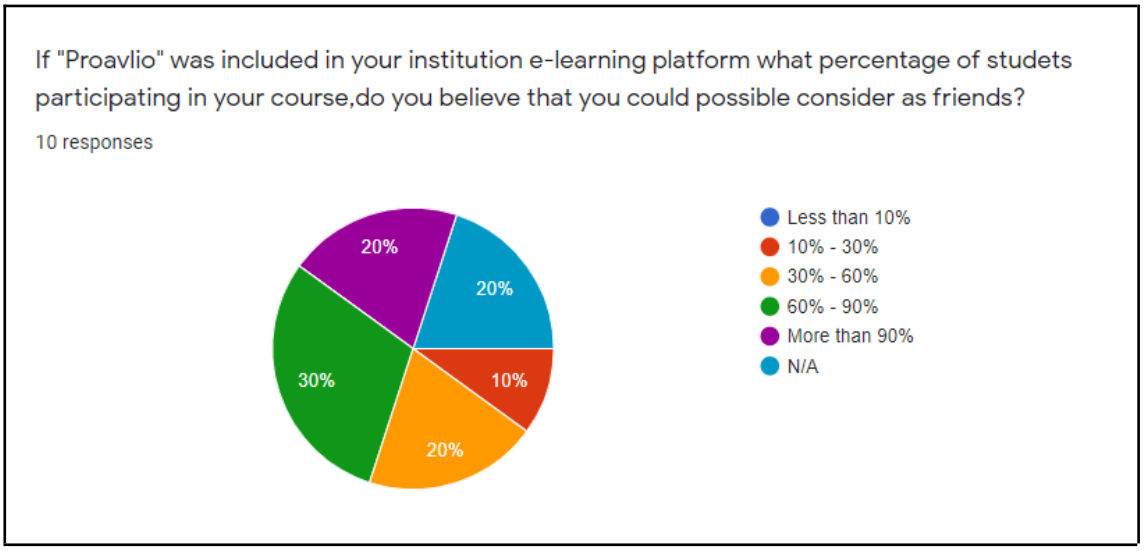

Figure 39. If "Proavlio" was included in your institution e-learning platform what percentage of students participating in your course,do you believe that you could possible consider as friends?

In the final question, respondents were asked to rate their level of satisfaction or dissatisfaction regarding with their experience with the “Proavlio”. Nine out of ten participants rate their experience either very satisfactory or satisfactorily, one participant has neutral attitude while no one expressed dissatisfaction.

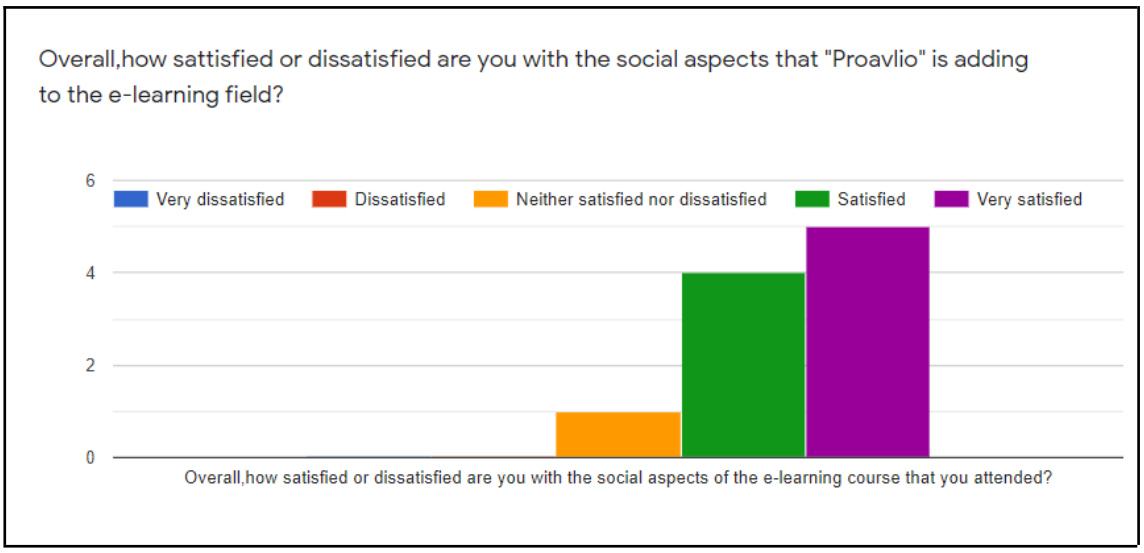

Figure 40. Overall,how satisfied or dissatisfied are you with the social aspects that "Proavlio" is adding to the e-learning field?

6 Discussion

6.1 Answering the research questions

The core “research question” that was settled in the beginning of the research was **“How can we boost student's social interaction inside an e-learning environment?**” and it was a question that structured the main body but also the details of this research.

Most of the data obtained by the students showed that people participated in e-learning facing problems regarding social interaction, problems that were mentioned in the quantitative and analysed in the qualitative research and who formed the final prototype. The “Proavlio” as judged by the participants was a solution that successfully answered the core research question, as it implements ways and options throughout of the social interaction inside an e-learning environment could be boosted.

The next research question was the broadest of all and the one that was the most difficult to be answered, however this should be the nature of the research, to always search for the best and not the most feasible due to fear of failing. The research question asked, **“How can we transform a university's campus attributes to electronic format?**” and raise the bar of the expectations for this research. The final prototype took some activities that traditionally can be met in a university campus and made them virtually accessible. The option of a radio station or a movie club managed by distance learners excites the participants and makes them feel more “active” members of their institutions.

Last but not least the third research question was about the improvement of the relationship between students themselves and teaching staff, more specifically the question stated, **“How to improve the relationship between distance students with teaching staff and other students?”**. The final prototype presented functions and options that will have a positive impact towards the relationship of students themselves, will boost their social interactions and throughout these the quality of their interpersonal relationships is expected to improve.

Nevertheless the field regarding the improvnave of relationship between students and teaching staff did not sufficiently develop something that was also depicted in the data obtained in the prototype evaluation.

6.2 Main findings

Literature review showed that the field of online education is changing rapidly (Adnan et al., (2020) and to extending widespread (Sathishkumar et al., 2020) due to multiple factors. However, a significant part of students seemed to be dissatisfied with the current level of e-learning platforms especially in the field of social interactions. This outcome was also highlighted in this study where students expressed their dissatisfaction towards the importance that e-learning platforms paid to social interaction among students.

The feeling of physical and temporal separation of tutor and student, and between students themselves (Croft et al., 2010) that is generally called as isolation was multiple times mentioned by the participants in both the quantitative and qualitative phases. Participants' views agreed with Cercone's (2008) views that interaction and collaboration should be part of a learning environment in order to facilitate a better level of learning amongst students.

Excerpt from frustration, it was easily visible that participants believed that a new solution should be provided, a solution that it will focus on the socialization of the students, that will let them learn more things about their classmates (Wicks, 2015) and assist towards the building of relationships with them. Students seemed to promote the idea of a "social media style" plugin that will support existing e-learning platforms in things related with social interactions, something that led to the creation of the "Proavlio" prototype.

Due to the numerous factors that are related in it, the evaluation of a learning material is always a complex task (Avogadro et al., 2016), however in this study the evaluation process works well and produces important outcomes. Participants liked the idea of social media that will be part of the institution, and their feedback showed that the future implementation of social networking tools that will include the attributes of collaborative and participatory

learning (Mnkandla & Minnaar , 2017) inside e-learning environments will be a step in the right direction.

Participants expressed different views and concerns though the implementation of three phases of the research where they participated, however the main outcome was that they share the same belief regarding the importance of socialization in the learning environments and the fact that this should be empowered through new and innovative solutions. As an addition to that , they support the idea of connection between the fields of social media and e-learning (Rosli et al , 2016) and appeared supportive towards a more collaborative supportive approach in future e-learning field that would focus on the process of building knowledge amongst the students.

6.3 LIMITATIONS

This study has potential limitations with the most important of them being sampling method, lack of researching experience and sample size.

The motivation behind this study emerged from the author's background and his observations. Author is an active member of the e-learning community, participating in more that 5 e-learning university degrees, however this led to a convenience sampling, where most of the 91 participants that responded were mostly selected from the courses that the author had enrolled. Probably this led to the overrepresentation of students of a specific age group (16-29) that had attended a specific e-learning's degree type (MSc).

Additionally, the size of the sample can be considered too small. A total of 91 e-learners participated in the first phase of the quantitative research and ten from them were randomly selected for the second phase of the qualitative research and for the final phase of the prototype's evaluation.

Something that could be considered as a limitation is that due to the fact that the prototype decided to be a plugin for already existing e-platformers the design process and the main structure of the plugin were limited in order to match the e-learning platform that was selected (Moodle). However, that keeps the participants out of the design process and without having a

say in the way that the prototype should be designed, except from their usability test in the evaluation session.

In closing, the lack of experience of the author led to some imperfections to the research procedure, such as the phase of the final prototype's evaluation where the four scenarios that the participants had to implement, were easier that it should have been, making the process less interesting for the participants and providing with fewer data the study.

6.4 Future Research

Some weaknesses of this research but also the large and complicated field of the subject give the possibility for extensive future research. A new research with a larger sample that will not be affected by convenience sampling would probably bring more reliable data.

Another factor that encourages new future research is the complexity of the subject under investigation as well as the many key stakeholders of it. This study covers the topic of social interaction in an e-learning environment from the perspective of students, with teaching staff or institutions not included in it. If we want to research the topic from all the angles, new similar researches should be implemented, researches that will cover the topic from the perspective of teachers, members of educational institutions and finally even parents of children that are attending an e-learning course.

Additionally, this study ends with a proposal of a plugin that will boost the level of social interaction in e-learning environments, a solution that could be effective and work efficiently however it would create new problems to be researched. Giving the students a place where they can interact free and without limitations and where they can upload every content they want, propose movies or expressed through radio shows, can create problems, mostly due to the fact that the responsible for all the content that will be upload and whatever will be displayed will be the institution, that will own the e-learning platform. Obviously some restrictions would be applied however even these restrictions are possible to create new problems regarding students' reactions related with freedom of expression. The lines between what should be allowed to be posted and what should be restricted are too close and whatever the limitations are, it is obvious that the students will demand smaller control over their

content. All these hypotheses of possible troubles by a social media plugin for e-learning platforms may explain the lack of existing similar solutions.

The prototype that was implemented was created for a website format, while most of the people, especially of young age are using their smartphones for social media use and social interaction with other persons. Since the majority of e-learning platforms now offer applications for smartphones, a future research for a similar product but in an mobile app version will be needed.

6.5 Conclusions

The scope of this research was to examine the field of social interaction that students have in the e-learning environments. The research made use of different methods ,approaches and multiple phases in order to deeply investigate the topic.

Literature review presents the situation of an emerging e-learning field that had to be transformed due to the increased demands that were suddenly created due to covid-19 crisis, highlighted the importance of social presence in learning environments and presented the difficulties and the things that had to be improved regarding e-learning and social presence.

The results obtained by the students revealed a high level of participants' frustration towards their institutions and the way the institutions are facing the issue of social interaction in the e-learning environment. Participants rate poorly the existing situation and the tools that are used for social interaction between students and teachers and support the idea of a solution that will let them feel less isolated and more active members of their institution's community.

A prototype of a “social media style” plugin named “Proavlio” was created in order to meet the criteria settled by the participants and was evaluated by participants themselves. “Proavlio” included a variety of innovative (for a e-learning platform) functions such as a radio station that would be managed by distance learners, a magazine where articles written by e-learners would published along with a movie club, where students will propose, vote and watch their favorites movies in zoom sessions. All these functions along with classic

functions used in social media platforms, such as direct messages and a timeline feed excited the participants who based on their answers considered “Proavlio” as a promising solution that would help students increase their level of social interactions in their courses, creating more strong relationships with other classmates and teaching staff and enjoy the educational experience more that they were used to do.

To conclude with, the final prototype is not considered to be neither a game changer in the field nor a panacea that would immediately heal all the problems and boost the efficiency of e-learning methods, but can be considered as a step towards the right direction and as stepping stone in which the upcoming researches can step in order to move forward and to achieve greater things, things that due to impact that a student’s thesis had, are impossible to be achieved through it.

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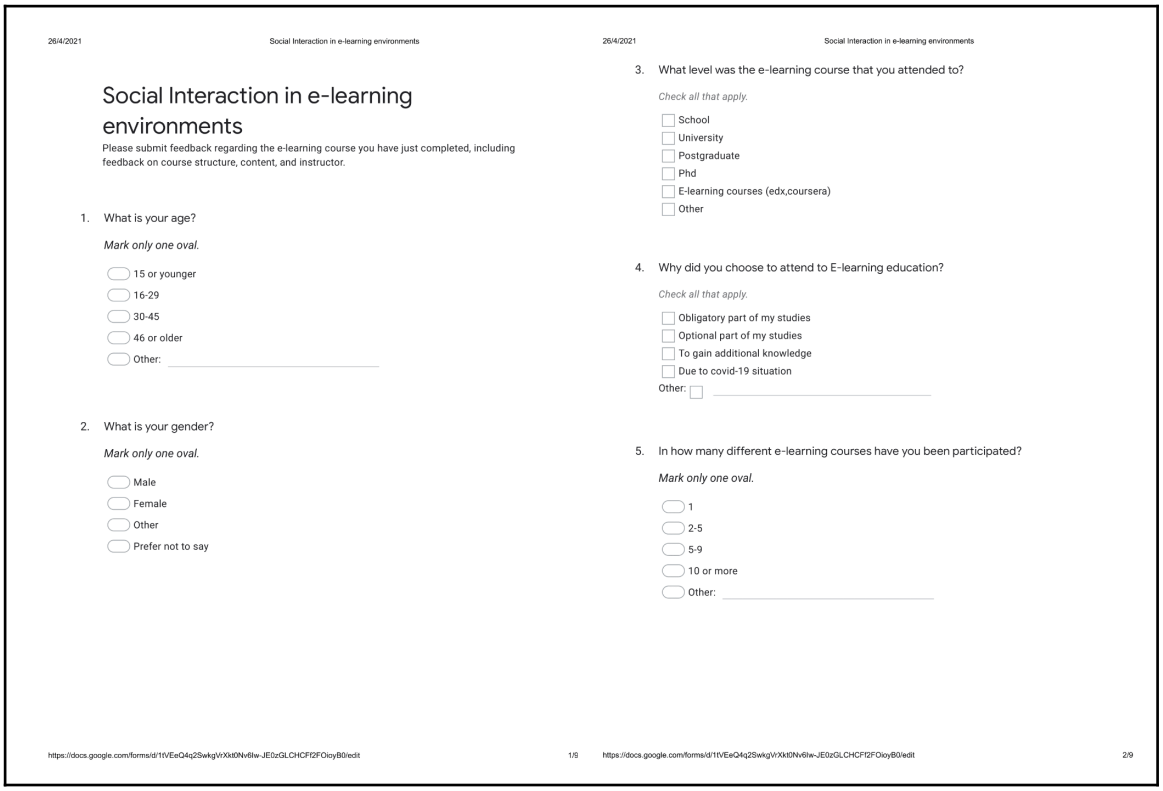
APPENDIX A QUESTIONNAIRE



26/4/2021 Social Interaction in e-learning environments

Social Interaction in e-learning environments

Please submit feedback regarding the e-learning course you have just completed, including feedback on course structure, content, and instructor.

1. What is your age?

Mark only one oval.

- ◯ 15 or younger
- ◯ 16-29
- ◯ 30-45
- ◯ 46 or older
- ◯ Other: _____

2. What is your gender?

Mark only one oval.

- ◯ Male
- ◯ Female
- ◯ Other
- ◯ Prefer not to say

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26/4/2021 Social Interaction in e-learning environments

3. What level was the e-learning course that you attended to?

Check all that apply.

- ☐ School
- ☐ University
- ☐ Postgraduate
- ☐ Phd
- ☐ E-learning courses (edx,coursera)
- ☐ Other

4. Why did you choose to attend to E-learning education?

Check all that apply.

- ☐ Obligatory part of my studies
- ☐ Optional part of my studies
- ☐ To gain additional knowledge
- ☐ Due to covid-19 situation

Other: ☐ _____

5. In how many different e-learning courses have you been participated?

Mark only one oval.

- ◯ 1
- ◯ 2-5
- ◯ 5-9
- ◯ 10 or more
- ◯ Other: _____

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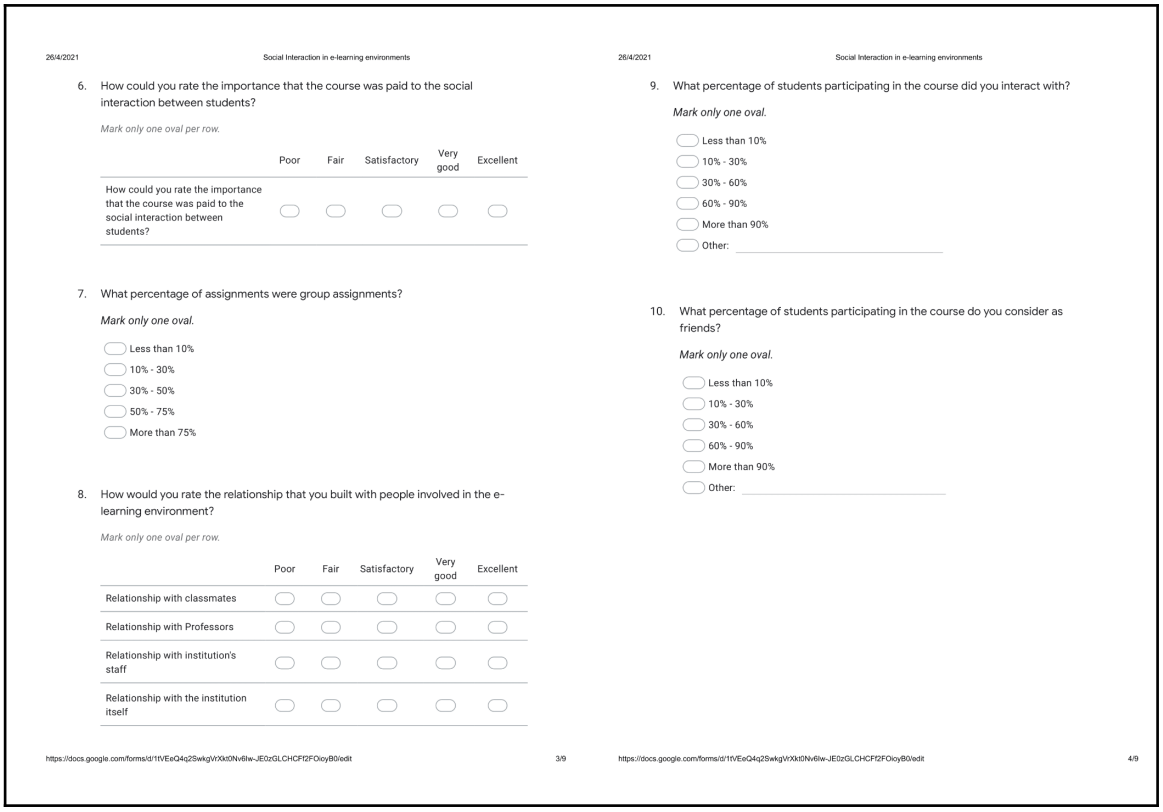
FIGURE A1. PAGES 1-2 OF THE QUESTIONNAIRE



26/4/2021 Social Interaction in e-learning environments

6. How could you rate the importance that the course was paid to the social interaction between students?

Mark only one oval per row.

	Poor	Fair	Satisfactory	Very good	Excellent
How could you rate the importance that the course was paid to the social interaction between students?					

7. What percentage of assignments were group assignments?

Mark only one oval.

- Less than 10%
- 10% - 30%
- 30% - 50%
- 50% - 75%
- More than 75%

8. How would you rate the relationship that you built with people involved in the e-learning environment?

Mark only one oval per row.

	Poor	Fair	Satisfactory	Very good	Excellent
Relationship with classmates					
Relationship with Professors					
Relationship with institution's staff					
Relationship with the institution itself					

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26/4/2021 Social Interaction in e-learning environments

9. What percentage of students participating in the course did you interact with?

Mark only one oval.

- Less than 10%
- 10% - 30%
- 30% - 60%
- 60% - 90%
- More than 90%
- Other: _____

10. What percentage of students participating in the course do you consider as friends?

Mark only one oval.

- Less than 10%
- 10% - 30%
- 30% - 60%
- 60% - 90%
- More than 90%
- Other: _____

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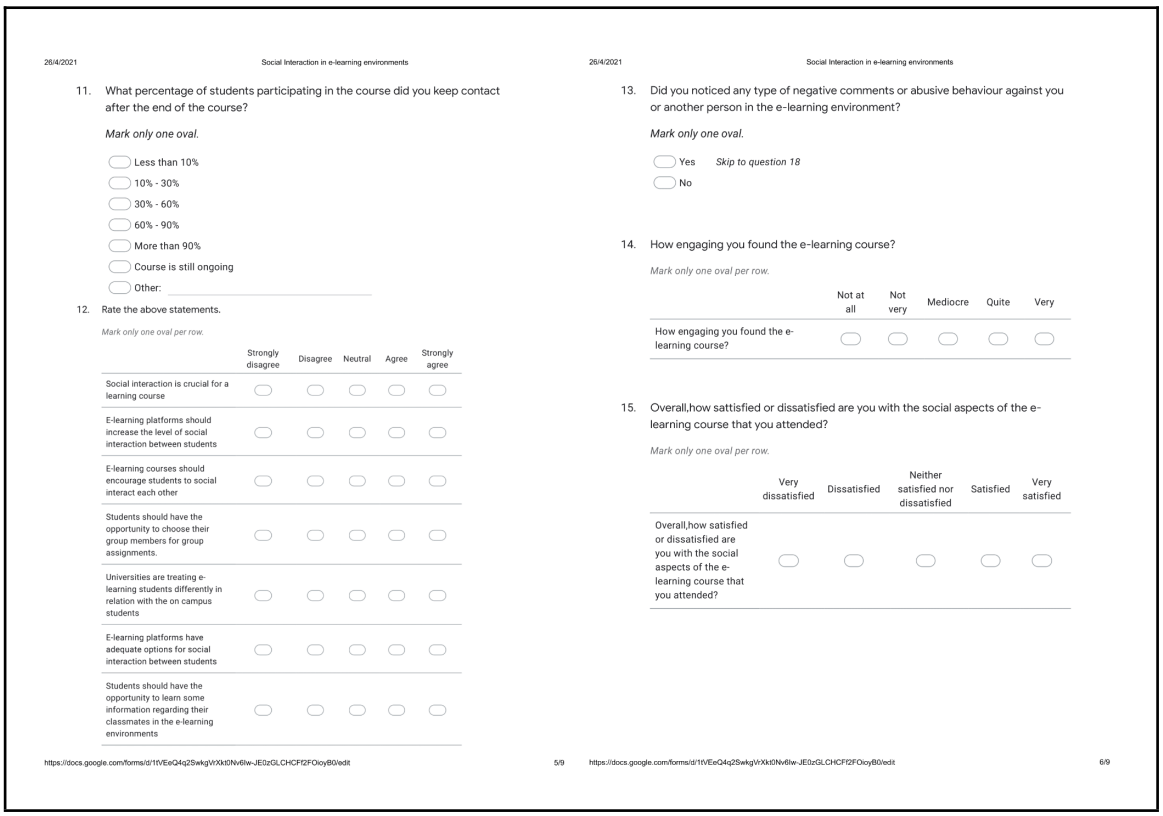
FIGURE A2. PAGES 3-4 OF THE QUESTIONNAIRE



26/4/2021 Social Interaction in e-learning environments

11. What percentage of students participating in the course did you keep contact after the end of the course?

Mark only one oval.

- Less than 10%
- 10% - 30%
- 30% - 60%
- 60% - 90%
- More than 90%
- Course is still ongoing
- Other: _____

12. Rate the above statements.

Mark only one oval per row.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Social interaction is crucial for a learning course					
E-learning platforms should increase the level of social interaction between students					
E-learning courses should encourage students to social interact each other					
Students should have the opportunity to choose their group members for group assignments.					
Universities are treating e-learning students differently in relation with the on campus students					
E-learning platforms have adequate options for social interaction between students					
Students should have the opportunity to learn some information regarding their classmates in the e-learning environments					

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26/4/2021 Social Interaction in e-learning environments

13. Did you noticed any type of negative comments or abusive behaviour against you or another person in the e-learning environment?

Mark only one oval.

- Yes *Skip to question 18*
- No

14. How engaging you found the e-learning course?

Mark only one oval per row.

	Not at all	Not very	Mediocre	Quite	Very
How engaging you found the e-learning course?					

15. Overall,how sattisfied or dissatisfied are you with the social aspects of the e-learning course that you attended?

Mark only one oval per row.

	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
Overall,how satisfied or dissatisfied are you with the social aspects of the e-learning course that you attended?					

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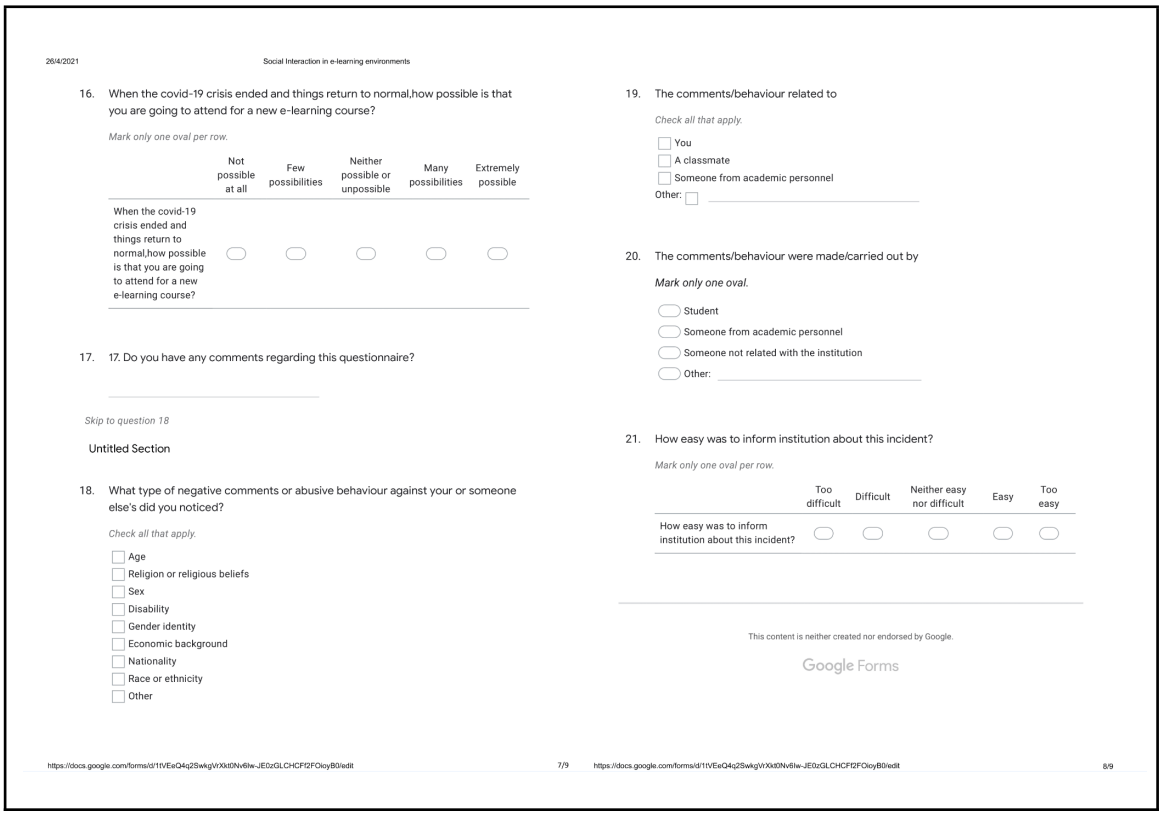
FIGURE A3. PAGES 5-6 OF THE QUESTIONNAIRE



26/4/2021 Social Interaction in e-learning environments

16. When the covid-19 crisis ended and things return to normal,how possible is that you are going to attend for a new e-learning course?

Mark only one oval per row.

	Not possible at all	Few possibilities	Neither possible or unpossible	Many possibilities	Extremely possible
When the covid-19 crisis ended and things return to normal,how possible is that you are going to attend for a new e-learning course?					

17. 17. Do you have any comments regarding this questionnaire?

Skip to question 18

Untitled Section

18. What type of negative comments or abusive behaviour against your or someone else's did you noticed?

Check all that apply.

- Age
- Religion or religious beliefs
- Sex
- Disability
- Gender identity
- Economic background
- Nationality
- Race or ethnicity
- Other

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19. The comments/behaviour related to

Check all that apply.

- You
- A classmate
- Someone from academic personnel
- Other:

20. The comments/behaviour were made/carried out by

Mark only one oval.

- Student
- Someone from academic personnel
- Someone not related with the institution
- Other:

21. How easy was to inform institution about this incident?

Mark only one oval per row.

	Too difficult	Difficult	Neither easy nor difficult	Easy	Too easy
How easy was to inform institution about this incident?					

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Google Forms

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FIGURE A4. PAGES 7-8 OF THE QUESTIONNAIRE

APPENDIX B CONSENT FORM

I, _____, agree to be interviewed by Angelos Theodoritsis.

- I confirm that my participation in this research project is voluntary.
- I understand that all data collected will be limited to this research only.
- I understand that I will not be identified by name in the final product.

- I am aware that all records will be kept confidential in the secure possession of the researcher.
- I acknowledge that the contact information of the researcher has been made available to me along with a duplicate copy of this consent form.
- I understand that I may withdraw from the study at any time with no adverse repercussions.

Subject's Full Name: _____

Subject's Signature: _____ Date Signed: _____

Appendix C Interview protocol

Introduction

Hello. My name is Angelos Theodoritsis.

Thank you for coming. This interview involves two parts. The interview is going to be short and consist of 10 questions.In case you did not understand something please feel free to interrupt me at any time.There are no right or wrong or desirable or undesirable answers. I would like you to feel comfortable with saying what you really think and how you really feel.

Is that ok?

Any comments?

Tape recorder Instructions

I will be tape-recording our conversation. The purpose of this is so that I can get all the details but at the same time be able to carry on an attentive conversation with

you. I assure you that all your comments will remain confidential. I will be compiling a report which will contain all students' comments without any reference to individuals.

Participants

Ten people that are attending an e-learning course.Seven of the being men, while three being women.3 of them are students of the West University of Sweden, attending a distance MSc in Robotics and Automation, 3 of them are attending a distance BEng (hons) in University of Portsmouth, 3 of them are attending e-courses in Coursera and edx while 1 is attending a distance Msc in Biorefineries in LUT University of Finland.

Context

In order to get more familiar with the context of the interview,let me give you a brief introduction,this is the second phase of a research that I am conducting and in which I am investigating the field of social interactions in e-learning environments.In the first phase i ask some general things throughout a questionnaire and based on the results that i received,i form 10 questions to further analyze the topic.The results that i will obtain today,will help me to evolve a prototype of a solution that will provide a solution toward to the problem of limited social presence of e-learners to their educational environments.

Any questions?
Shall we begin?

Interview - Questions

- Do you feel that your institution is treating you differently in relation with campus students?
- Do you feel "isolated" from the institution and its activities?

- How important is to the student to decide from his/her group members for an assignment?

- What is the main reason that students in e-learning environments appeared to not evolve storing relationships with their classmates or their teachers?

- How would you rate the social options that the platform that is based on your e-course has?Are enough for the socialization of an e-learner?

- Do you believe that e-learning should become more entariting and except from its knowledge, invest in things that will make students enjoy their course?

- The problem of socialization should be solved through existing solutions provided by universities or throughout something new?

- How would you consider a specific social media application that it will be used only for socializing for university reasons?

- Should the students be available to rate (Either positive,or negative) his/her classmates?Does this action may have a positive effect on social relationships between students or it will worsen the situation?

- Do you have any further recommendations?Any solution that in your eyes could enhance social interaction for e-learners.

Great,this ends our interview session.I would like to thank you for your participation.

Appendix D Evaluation session protocol

Introduction

Hello. My name is Angelos Theodoritsis.

Thank you for coming. This session involves two parts. The evaluation of the prototype and some extra questions that i am going to ask you, when you will finish it. In case you did not understand something please feel free to interrupt me at any time.There are no right or wrong or desirable or undesirable answers. I would like you to feel comfortable with saying what you really think and how you really feel.

Is that ok?
Any comments?

Video recorder Instructions

I will be video-recording our conversation. The purpose of this is so that I can get all the details but at the same time be able to carry on an attentive conversation with you. I assure you that all your comments will remain confidential. I will be compiling a report which will contain all students' comments without any reference to individuals.

Participants

Ten people that are attending an e-learning course.Seven of the being men,while three being women.3 of them are students of the West University of Sweden, attending a distance MSc in Robotics and Automation, 3 of them are attending a distance BEng (hons) in University of Portsmouth, 3 of them are attending e-courses in Coursera and edx while 1 is attending a distance Msc in Biorefineries in LUT University of Finland.

Context

In order to get more familiar with the context of the interview,let me give you a brief introduction,this is the third phase of a research that I am conducting and in which I am investigating the field of social interactions in e-learning environments.In the final

phase you will test a prototype that was created based on the feedback that i received from you and the other participants during the earlier phases of the research. The prototype named “Proavlio” is a social media style plugin that will be used in Moodle platform as a tool that will increase the social interaction amongst students. It reminds of a classic social media app but is interested in things that are related with the institution that a distance learner attends. During this evaluation session you will be called to complete four different tasks inside the environment of “Proavlio” and you will also be free to navigate through it and express your thoughts or concerns. During the session you will be asked to express yourself and your thoughts loudly, in order to gain a better understanding regarding your experience, this is part of a “Think a loud” protocol that i am going to use through this evaluation. Finally when you will be finished with the scenarios i am going to ask you five likert scale questions.

Any questions?
Shall we begin?

Interview - Questions

- Can "Proavlio" improve the level of student's social interaction in an e-learning platform

- If "Proavlio" was included in your institution e-learning platform,how possible is to make you feel more "active" member of the institution's community?

- If "Proavlio" was included in your institution e-learning platform the e-learning experience would be more engaging.

- If "Proavlio" was included in your institution e-learning platform what percentage of students participating in your course,do you believe that you could possible consider as friends?
- Overall,how satisfied or dissatisfied are you with the social aspects that "Proavlio" is adding to the e-learning field?

Do you have any further recommendations? Something to add regarding some issue that you faced during the evaluation?

This is the end of our session, i want to thank you for your participation in this research.

APPENDIX E PROTOTYPE SCREENS

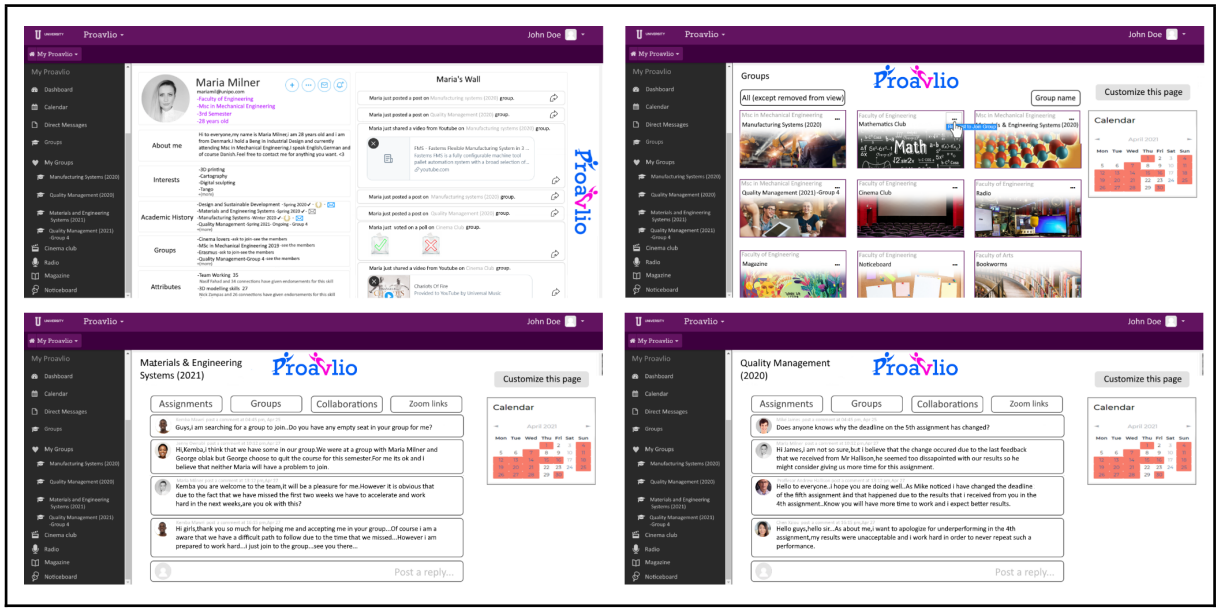

FIGURE E1. SCREENS OF THE PROTOTYPE

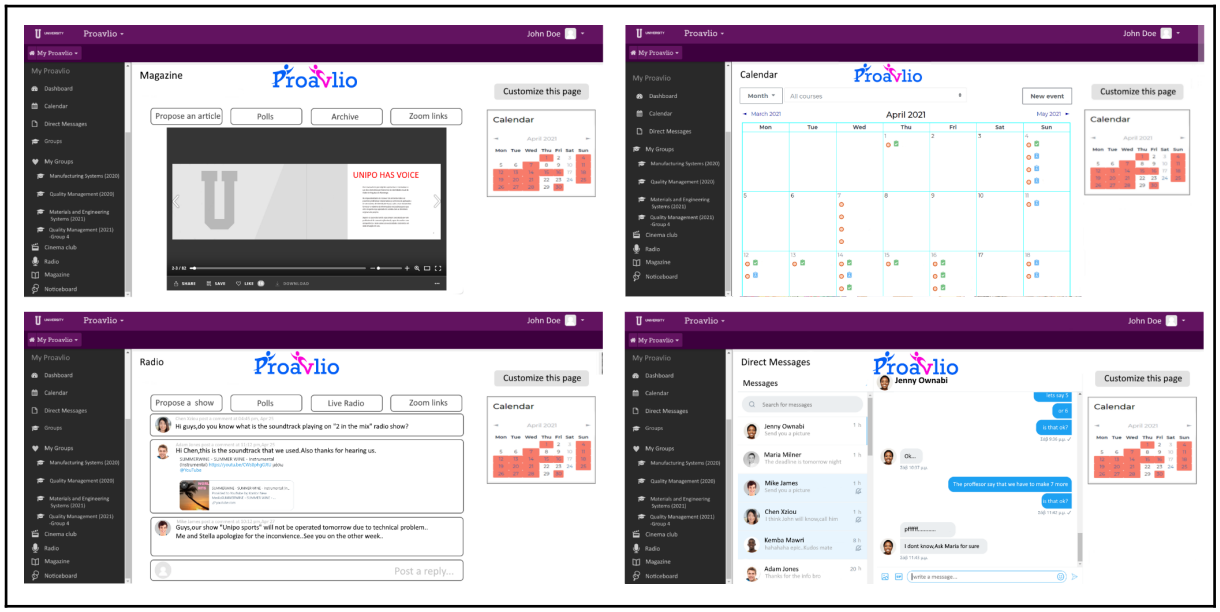

FIGURE E2. SCREENS OF THE PROTOTYPE