

## **MOOCs: A Fad or a New Paradigm Shift in Higher Education?**

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### **Abstract**

With the transition of education to the digital environment, new architectures of knowledge and learning began to emerge. Several new formats of online education have been instigated including MOOCs (Massive Open Online Courses) that combine video lectures (live and recorded), interactive quizzes and social learning aiming to attract a massive number of participants. With the global financial crisis and the dwindling of public and private budgets in the educational landscape, as well as the increasing costs, MOOCs have become the subject of one of the most prevailing debates in higher education. Advocates of MOOCs believe that they embody the ultimate democratization of education, by making education more accessible to everybody with an internet connection, while disrupting the traditional physical and online pedagogical structures by incorporating a social, distributed, networked approach and significant learner autonomy. Skeptics, on the other hand, voice concerns that MOOCs will lead to a diluted educational system or they are just perceived as marketing vehicles for global education brands. This paper addresses the emergent trends around MOOCs in higher education institutions and the new pedagogical structure being put forward through a case study of a MOOC implementation at the University of Nicosia.

**Keywords:** MOOC, Higher Education

## **Introduction**

The rapid developments in the new information communication technologies have fundamentally changed our lives in every aspect, including the way we communicate, learn and do business. Access to knowledge and education is not only one of the highest priorities in a knowledge-based society but also the driving force for competitiveness, professional re-establishment, social integration, the activation of citizens and for personal growth and development. The activities of learning and training take place in various environments which presuppose a bigger investment in human potential, knowledge, technological and non-technological infrastructure. The transition of education to the digital environment has enabled the emergence of new architectures of knowledge and learning modes, one of these forms being the MOOC – the massive online open courses offered by several prestigious universities worldwide.

Clayton Christensen, disruption innovation theorist, considered MOOCs as a disruptive innovation of higher education (Hardesty, 2013), raising questions about the role of higher education and sustainability of universities when courses are available over the internet and for free (Laurence, 2013; Ferenstein, 2013). Another school of thinkers believes that MOOCs will put universities out of business (Smutz, 2013) and still others believe that they will not have any effect on higher education (Crispin, 2012). Billington and Fronmueller (2013) have identified several challenges in relation to MOOCs in addition to the business revenue problem such as grading issues, cheating, course credits, and so on. They do believe, however, that these challenges are currently being addressed in response to pressure to lower fees in higher education, which have resulted in large student debts.

In this paper, the case of MOOCs in higher educational institutions is being addressed, and a new pedagogical structure is put forward through a case study of a MOOC implementation at the University of Nicosia. In the sections that follow an overview of the past and present situation of MOOCs is presented, followed by their potential impact on higher education as presented in the existing literature. The University of Nicosia case of MOOCs is presented along with our conclusions and future work.

## **MOOCs: past and present**

The idea of mass delivery of instruction can be traced back to 1922 when New York University endeavored to bring higher education economically to the people via radio delivery. Several others followed including Columbia, Harvard, Kansas State, Ohio State, NYU, Purdue, Tufts, and the Universities of Akron, Arkansas, California, Florida, Hawaii, Iowa, Minnesota, Nebraska, Ohio, Wisconsin, and Utah, offering radio courses in a variety of topics ranging from Browning's poems to engineering, agriculture and fashion (Sementelli & Garrett, 2015; Matt & Fernandez, 2013).

According to Marques and McGuire (2013), the contemporary MOOCs have their genesis in the Massachusetts Institute of Technology (MIT) OpenCourseWare project of 2000. Courses in which content was posted online in the form of PowerPoint lecture notes. Others attribute the origin of the term "MOOC" to members of the University of Manitoba (Daniel, 2012). They are internet-based teaching programs designed to handle thousands of students at the same time. Their target is unlimited student participation in open access courses via the web. They make use of the various tactics of social-networking sites for social learning, supplementing them with video lectures (live and recorded). Much of the learning comes from online comments, questions and discussions among faculty and students themselves, while both modes of communication, asynchronous and synchronous, are being used (Waldrop, 2013). MOOCs, as we know them today, appeared on the scene in 2012 when several educators, social entrepreneurs, charitable foundations, universities and venture capitalists began forming initiatives to unite the best online tools with the most prestigious teaching available. Examples of these platforms are Udacity, Coursera and edX. They are

promoted through online social media, a website describing the course schedule, goals, useful information (e.g. FAQs), and a registration form for potential participants. They capitalize on the strengths, experiences, skills and knowledge of the learners, and promote collaboration between people of varied interests. They are usually free and open while their ROI is to bind participants to the institution’s brand. Figure 1 displays a timeline of the development of MOOCs and open education with respect to various organizational efforts in the area.

MOOCs have evolved into two distinct types: those that emphasize the connectivist philosophy indicating that material should be aggregated (rather than pre-selected), and those that resemble more traditional courses. They are usually referred to as "cMOOC" and "xMOOC" respectively. cMOOCs attempt to connect learners with each other to answer questions and/or collaborate on joint projects, while xMOOCs use video lectures, computer-marked assignments, peer assessment, supporting materials such as slides, supplementary audio files, links to other resources and online articles, a shared comment/discussion space, and certificates are given after completion (Hill, 2012; Armstrong, 2012). They are polarized into two main groups: (1) MOOCs whose certificates - or, better still, degrees - are given value in the job market; (2) MOOCs that aim to contribute to the personal betterment of the “student”.

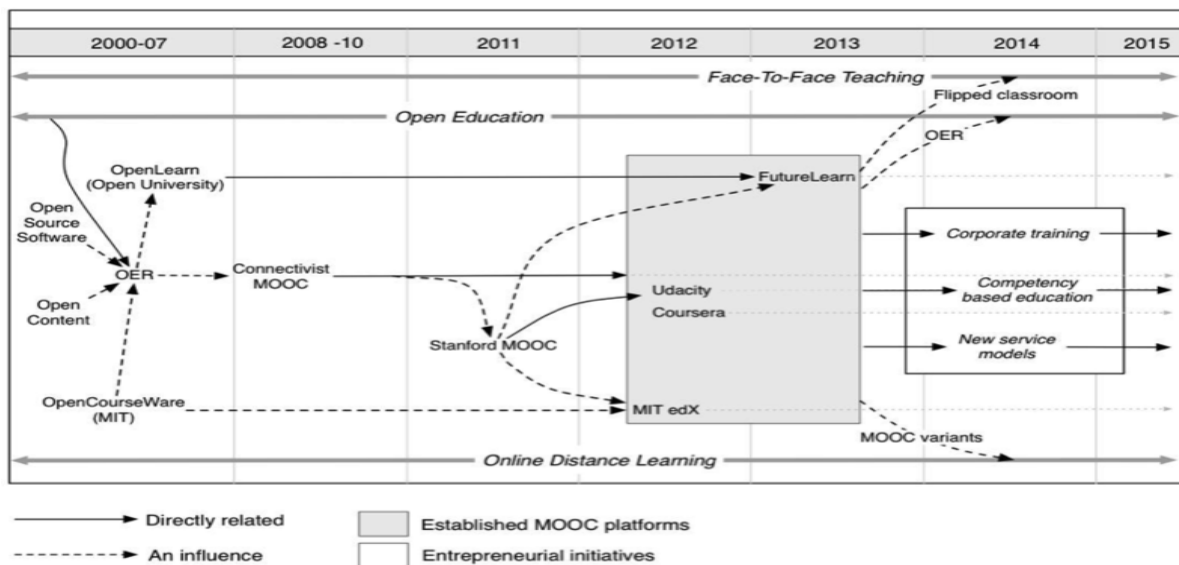


Figure 1<sup>1</sup>: Timeline of MOOC and open education development along with organizational efforts.

According to data by Class Central statistics (2015)<sup>2</sup>, over 35 million students signed up for at least one course in 2015 (which is an estimated increase of 16-18 million since 2014).

<sup>1</sup> Source:

[https://en.wikipedia.org/wiki/File:Timeline\\_of\\_MOOC\\_and\\_open\\_education\\_development\\_with\\_organisational\\_efforts.png](https://en.wikipedia.org/wiki/File:Timeline_of_MOOC_and_open_education_development_with_organisational_efforts.png)

### Course Distribution by Providers

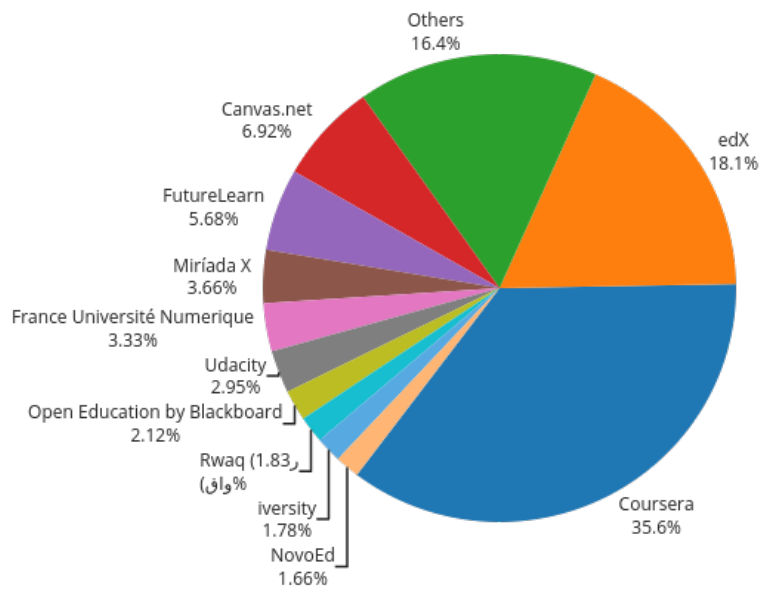


Figure 2<sup>2</sup>: Course distribution by providers

### Course Distribution by Subjects

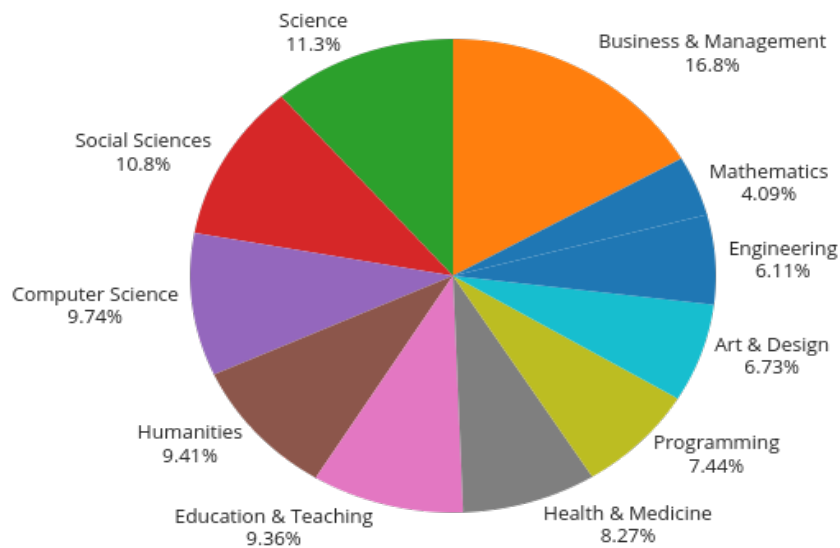


Figure 3<sup>3</sup>. Course distribution by subject

<sup>2</sup> Source : <https://www.class-central.com/report/moocs-2015-stats/>

<sup>3</sup> Source : <https://www.class-central.com/report/moocs-2015-stats/>

### **Impact of MOOCs in Higher Education**

An international group of higher education institutions (UT Arlington, Stanford, Hong Kong University, etc.) was called upon by learning researcher and theorist George Siemens in October 2014 in order to discuss and identify the impact of MOOCs on higher education (Salisbury, 2014). The challenges faced by universities in their transition to the digital world, irrespective of size, budget and reputation, were all similar. Their discussions concluded the following:

- Increased institutional consciousness around the digital future. - Institutions around the world work on a daily basis to define future models of digital higher education.
- Elevated appreciation for the profession of teaching. - Even though research has a privileged position at universities, MOOCs have assisted in diverting the focus to the teaching and learning process as well.
- Team-based course design. - The creation of MOOCs requires the collaboration of people across the whole university. Teamwork is required among instructional designers, software developers, researchers, and librarians, and videographers team up with faculty (the domain experts) to create each MOOC.
- Privileging institutional capacity building over outsourcing. - To collectively use the MOOC experiences so far to build capacity for conceptualizing and driving subsequent change to design and shape the digital era.
- Creation of new space for experimentation. - New challenges are emerging such as shared governance and extended decision making cycles. MOOCs have paved the way for increased experimentation and innovation in teaching and learning.

In the literature, different opinions exist regarding the role of MOOCs in higher education. Some view it as disruptive if we consider the acceptance of MOOCs for credit hours. Universities such as the University of Nicosia, Colorado State and others are offering three credits for MOOC completion. The University of Nicosia counts the MOOC in Introduction to Digital Currencies as three credits for their MSc program in Digital Currency. Another indication of their disruptive character is the growth of companies offering MOOC platforms (Coursera, EdX, and Udacity) and their growing clientele. This disruptive appeal of MOOCs has raised several questions about the role of higher education and the sustainability of universities when courses are available over the internet for all, with or without any qualifications as a prerequisite. Questions have been raised about whether they are a threat to higher education due to the free content. Several institutions are looking into utilizing new business models to include free content while charging for additional services, following the examples of online giants such as Facebook and Google. MOOCs may serve an economic purpose, and usually their return on investment (ROI) is to bind participants to the institution's brand. In addition, they become a source of data for researchers as they can provide data from thousands of learners to study the impact of technology on learning.

On the other hand, MOOCs represent a departure from the clichéd idea of physical classrooms promoted by the conventional educational systems and assist in flattening the world. In a keynote address at the Sloan Consortium Conference, Sebastian Thrun, known also as the godfather of free online education and one of the Udacity founders, outlined the true democratization of learning through MOOCs. He highlighted that his Stanford students preferred his online class to the physical one because quizzing was better than lecturing and it was always accessible. With a course on artificial intelligence, which had 160,000 learners, Thrun began to realize the opportunities that MOOCs present to non-traditional learners. Even with thousands of fellow students, students can have an intimate, one-on-one learning experience (Skiba, 2012).

Marguerite (2015) outlines a list of items that need to be considered for MOOCs to have an impact on higher education. These include, but are not limited to, accreditation agencies, book publishers, state subsidies, rating agencies, advanced placement exams, branch campuses, IT managers and so on.

However, MOOCs do not come without any pitfalls. New forms of cheating arise, retention and completion rates become a challenge for institutions, grading papers becomes impossible for the instructors due to the mass number of students, and the list goes on. In addition, as stated above, a business model to demonstrate revenue-generation is required (Petrovska, Delipetrev & Zdravev, 2014; Heller, 2013).

### **The University of Nicosia MOOC in MSc - Digital Currency**

In the Spring semester of 2014, the University of Nicosia in Cyprus launched the first Master of Science degree (MSc) in Digital Currencies. The MSc commenced with an introductory MOOC around decentralized digital currencies (or cryptocurrencies) and blockchain, which is open to anybody interested in the subject matter. A hybrid model between xMOOC and cMOOC delivered twice a year in a mixed-learning fashion has been followed. Students tune in to follow online live streaming sessions on set weekly dates and participate in online discussions, while flexibly gaining access to course materials in their own schedules, including weekly quizzes with a set date for the final exam. Since then, more than 3300 people have registered for it. During these first five sessions of the MOOC, useful data have been collected that are analyzed and are being used to identify potential interest in the MSc degree and into cryptocurrencies in general. Some of the data collected are presented in this paper.

The University of Nicosia MOOCs have attracted so far a diverse, broad, and non-traditional group of students originating from 76 countries. Top countries in the list are the US, Canada, the UK, Spain, Cyprus, The Netherlands, Germany, and Australia. The audiences are (1) employed: ~68%, (2) unemployed: ~15%, (3) students: ~12%, (4) retired: ~5%. Figure 4 shows the top countries of student origins. As expected, female participation is low with 90% male and 10% female. We say “as expected” as it is common knowledge (Connerley 2016; Milavarapu 2016) that there are not many women interested in technology. Figure 5 shows the student age, while Figure 6 shows the reasons for participating in the MOOCs. It is interesting to see that more than 30% took part in the MOOCs because they were curious about MOOCs and online education and ~60% wanted to gain a broad overview of the subject, in-depth knowledge, or gain professionally-useful skills. These two results are aligned with other studies that have taken place regarding MOOCs (Hew & Cheung, 2014) in the sense of being the reasons why students are interested in taking part in a MOOC. The expression of interest in continuing to the MSc has been as follows: MOOCs 1-3: 60%, MOOC 4: 55%, MOOC 5: 70%.

Students participating in the MOOCs have the opportunity to qualify for two kinds of accredited certificates, provided in digital form, and in fulfillment of certain criteria: (a) Certificate of Accomplishment - at least 75% of a set of quizzes and at least 60% in the final exam, or (b) Certificate of Participation - at least 75% of a set of quizzes. Certificate hashes (unique file identifiers) were embedded in the Bitcoin Blockchain. Throughout the five MOOCs, 15% of the participants have received a Certificate of Accomplishment and 1.3% a Certificate of Participation.

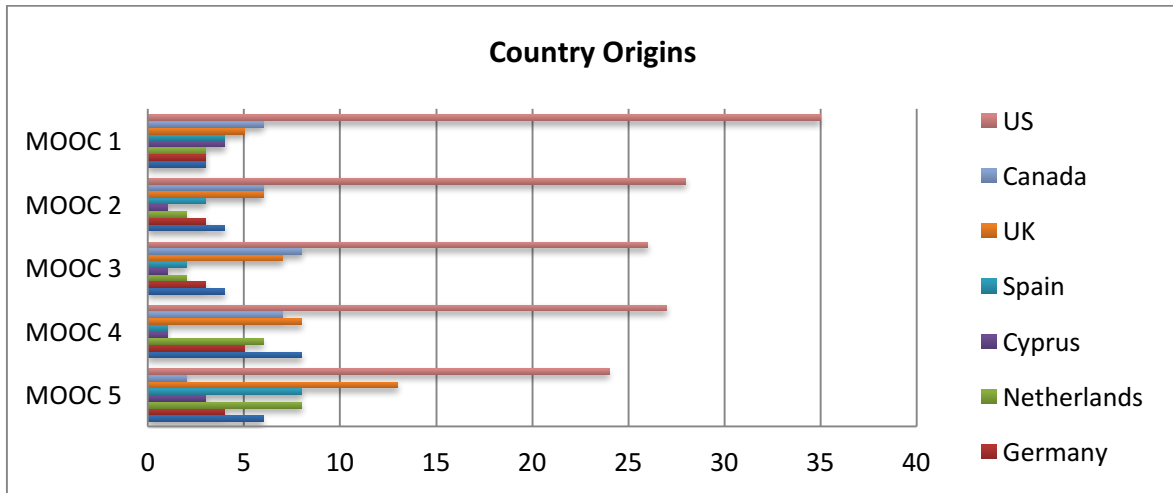


Figure 4. Top countries of student origins in University of Nicosia MOOCs

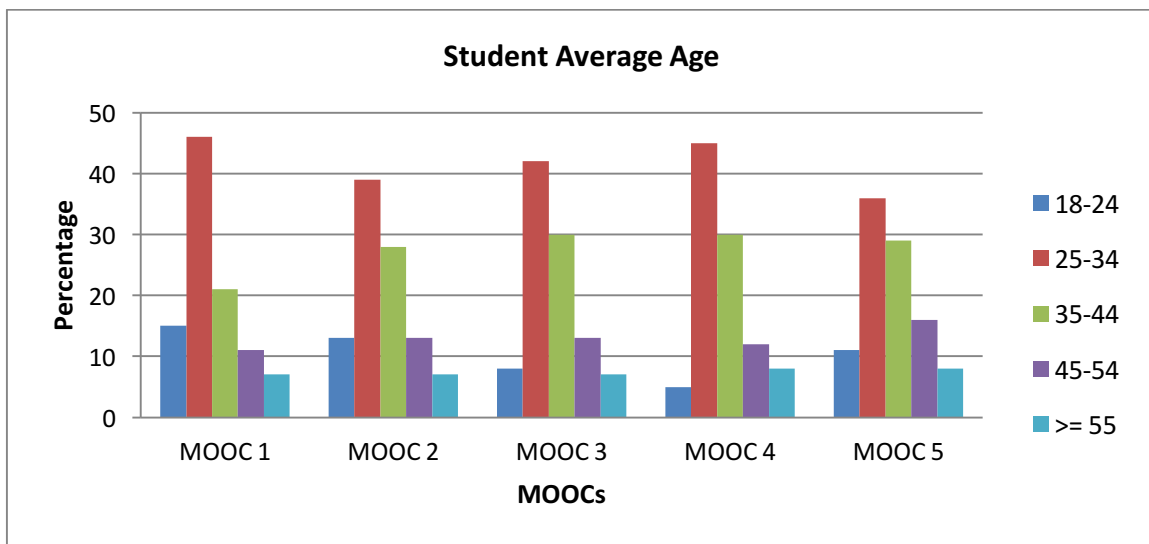


Figure 5. Student Age in University of Nicosia MOOCs

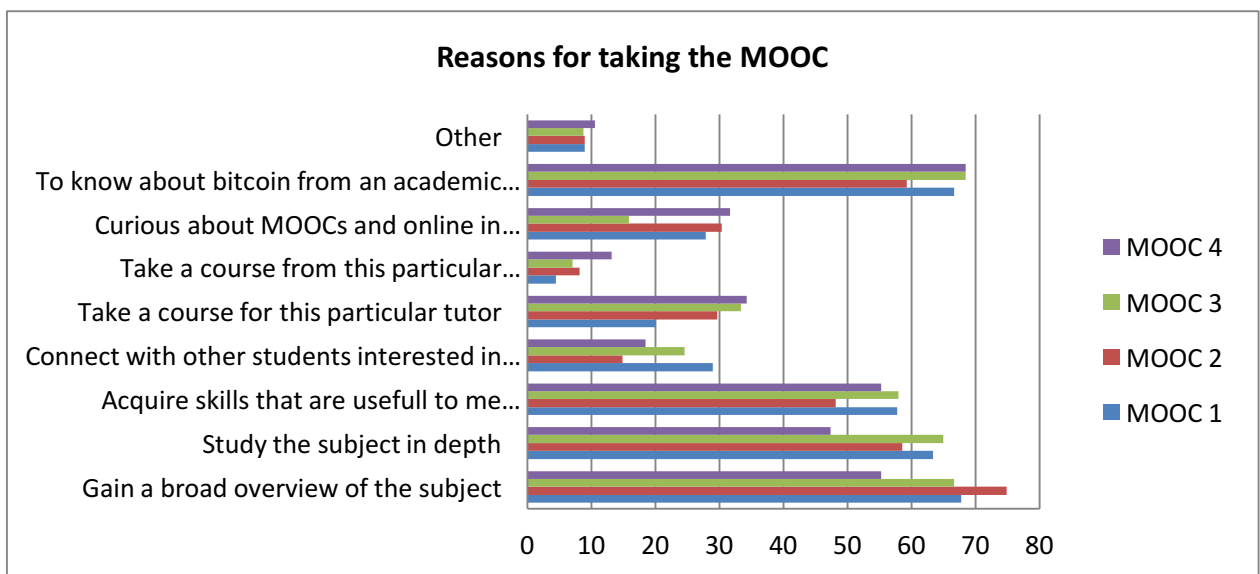


Figure 6: Reasons for taking the University of Nicosia MOOC

### **Findings from our experience**

For the past 2.5 years, our MOOCs have been acting as a catalyst for the development of a totally new program that has been developed to respond to the dynamics of our society. They have defined a new learning and sustainable model within our existing digital educational model that has been running for the past few years. They assist in our “brand building” and social responsibility as well as in the promotion of our Digital Currencies program. To be able to create and run a MOOC requires the collaboration of several people and departments that need to collectively work towards building our capacity to drive changes. These include instructional designers, software developers, IT technicians, instructors, researchers, and videographers to team up with the faculty who are actually the domain experts. They are constantly providing us with data that can be used to study the impact of technology on learning. This assumes excellent faculty, great collaboration among the whole team, as well as a good infrastructure.

The general challenges of student debt, declining state support and disruptive technologies have made it imperative to look at new models for teaching. The University of Nicosia has followed a hybrid model of the online MOOC and conventional distance learning for the acquiring of a degree. We have shown that in this case, MOOCs are not disrupting higher education. Instead, they become another enabler of higher education. MOOCs do not offer an official university degree. University degrees provide eventual graduates with a job and this is what the students are paying for, no matter how good a MOOC is. In terms of the technology used, evidence suggests that online learning will soon be changing again. Taking a walk down memory lane along technological tools in education, we started from offline tools such as CDs and then we moved to online and simulated environments, which are also changing continuously due to the emergence of new technologies. We will soon be looking into new digital environments through the use of virtual reality, which simulates physical learning environments, enabling practice in hazardous environments or training in how to respond in emergency situations. MOOCs or any other form of free education can play an important role for non-profit organizations and governments to enable them to offer free education to the under privileged. At the same time, educational institutions and other organizations will be using them for enhancing their social responsibility and binding learners to their brand as in the case of the University of Nicosia’s MOOCs.

### **Conclusions and Future Work**

MOOCs represent a departure from the clichéd idea of physical classrooms. Their open accessibility and free content is viewed by some as a disruption not only in distance learning but to higher education in general. They help flatten the world by helping to bring down the “walled gardens” promoted by conventional educational systems. Even so, they may serve an economic purpose depending on the business model followed. This disruptive innovation will not be going away soon. One indication is the acceptance of MOOCs for credit hours. Another indication is the growth of companies offering MOOC platforms and their growing clientele. Student debt, declining state support and disruptive technologies have made it imperative to look at new models for teaching. Our experience has shown that MOOCs are supplementing, not replacing traditional higher education. A hybrid model of online and conventional learning has been utilized to bring to the world a new MSc program in new areas of digital currencies and block-chain technologies at the University of Nicosia.

The focus of this work, being distance learning for all, has raised further questions for the team. Our future work will focus on the university’s role in general given the changing dynamics around us, just like the role of telecom companies has changed with the emergence of the internet. Will brick and mortar education become the privilege of the few? Why not



work on designing the future of the educational system instead of waiting to see how it evolves? For an ideal future society, the collective intelligence and experience of teams such as ours can be used to assist in designing and shaping future learning environments from the local to the global level. Our work will focus on future scenarios that could assist in developing a system which would nurture and promote humanistic values and respond to the challenges encountered by humanity for a smart sustainable future.

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