Building an infrastructure for empowering Distance Education in the Open University of Cyprus

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Abstract

Universities worldwide offer distance education courses through a number of channels. There is a plethora of courses offered either as part of official Programs of Study that lead to a degree or even as Vocational Training Programs or as MOOCS. The Open University of Cyprus (OUC) is the only higher education organization in Cyprus dedicated to distance education using an innovative eLearning Platform named eClass.

The eClass eLearning Platform is the main educational medium of the Open University of Cyprus that hosts a number of services, courses, educational content and activities. The scope of this paper is to describe the eLearning Platform and the offered services that are integrated under its umbrella, like the Video Lecture and Streaming service, the Synchronous Learning service and the Plagiarism Detection service. Moreover, this paper presents an overview of how this platform is integrated to the University's infrastructure for user creation and management, student enrolments and library services. We conclude by presenting metrics of the eLearning Platform usage.

Keywords: distance education, eLearning Platform, Moodle, infrastructure

1. Introduction

"Distance education is teaching and planned learning in which teaching normally occurs in a different place from learning, requiring communication through technologies as well as special institutional organization" (Moore & Kearsley, 2011). Technology is critical in the concept of distance education, as educators and students are located in different places and for teaching and learning respectively, they need some form of communication technology. First generation distance education involved the usage of print-based correspondence education. Second generation distance education involved the usage of educational television and radio. Both were lacking the bidirectional communication between the educators of the institutional organization and their students (Bates, 2005). It was the explosion of Internet in 1995 that has expanded the possibilities and potentials of the communication and educational technology, leading it to the third generation and opening new horizons in distance education. Nowadays distance education has established its name in higher education, having high numbers of people (academics, researchers, students, media) taking advantage of its abilities. Moreover, new technologies allow students who combine their studies with work and family life to attend courses and evolve their careers.

The Open University of Cyprus (OUC) is a public university and the only higher education institution in the country dedicated to distance education. The OUC uses open and distance education to provide undergraduate and postgraduate courses, continuous education and retraining and to promote life-long learning (Republic of Cyprus, 2002). The University has gradually grown its academic presence and reputation in Cyprus and Greece in just ten (10) Academic Years by incrementing its Programs of Study from two (2) in 2006 to twenty-one (21) in 2015 and its enrolled students from 162 to almost 5000. The Ministry of Education and Culture has recently appointed a coordinating role to the OUC in distance education in Cyprus, to promote and offer inter-university programs in English.

2. Learning Methodology

The main organizational unit of the OUC's Programs of Study and Training Programs is the thematic unit that covers several subject areas. Each Program of Study belongs to one of the three Schools (Faculty of Humanities and Social Sciences, Faculty of Pure and Applied Sciences, Faculty of Economics and Management). A Dean is responsible for a School and assigns the role of the Academic Coordinator to educators responsible for a specific Program of Study. In each thematic unit, there is an educator who has a coordinating role for monitoring Tutors and students and is also responsible for the knowledge resources and activities in it. Students are enrolled in groups in each thematic unit and a Tutor is assigned to every group for lecturing and assisting them throughout the thematic unit's duration.

Successful completion of a thematic unit by a student, requires submission of a number of written assignments and a final examination that requires physical presence. Depending on the duration of each thematic unit, students have the opportunity to attend a number of organized group meetings with their Tutor. The primary goal of the OUC's learning methodology is to help students participate in their thematic units from anywhere and at any time without limitations to their academic progress. Having this goal in mind, and following the advancement of the technology, the OUC's learning methodology has evolved during the years, incorporating a number of educational and communication tools.

Nowadays, the OUC's eLearning Platform named eClass, facilitates every step of this learning methodology. This was not the case during the first years of the OUC's operation, as students were required to physically

attend all the group meetings which took place in a physical class. These physical meetings occurred in major cities of Cyprus and Greece, where the majority of OUC's students were situated. This policy has recently changed by gradually decreasing the number of physical meetings and replacing them with virtual meetings using the Synchronous Learning service available in the eClass eLearning Platform.

As with group meetings, several other procedures in the learning methodology were refined and expanded, by using new technologies, like the Plagiarism Detection Service and the Video Lecture and Streaming Service. It is obvious that building an infrastructure for empowering distance education in the Open University of Cyprus is a crucial and huge step towards supporting the educational process.

3. The OUC eLearning Platform

The eClass eLearning Platform is a continuously evolving system based on Moodle[1] open source learning course management system, which supports both blended learning and online courses. This platform is designed to provide educators, administrators and learners with a robust, secure and integrated system that provides tools for content creation and delivery and allows users to have a single point of entry to all the eLearning services of the OUC. Moreover, it hides the technical complexity of each of the different services provided, since users get only to see one platform that comprises of six core services:

- The Asynchronous Learning service where students and educators have 24/7 access to educational content, resources and activities,
- The Synchronous Learning service where students can participate in virtual classrooms and interact with their educators and fellow students,
- The Video Lecture and Streaming service where educators can capture their lectures and deliver them live or on demand and students have access to streaming video of lectures and events,
- The Assignment Submission and Plagiarism Detection service that enables students to submit electronically their coursework and automatically notify their educators for possible plagiarism,
- The Learning Activity Management System (LAMS) which provides educators with a visual authoring environment for creating sequences of learning activities for their thematic units and
- The Mobile Learning service where students can view their thematic units and participate in them through their smartphones or tablets

The eClass eLearning Platform is the only educational medium used in the OUC to facilitate its learning methodology. At any given time, eClass hosts the current Academic Year. The hierarchical structure in eClass resembles the academic hierarchy of the OUC. Each School comprises of Programs of Study and each Program of Study comprises of thematic units. User roles in eClass also match those of the educational model. This mapping makes it easier for new users to understand the academic hierarchy and how it works.

All the thematic units have the same basic structure in eClass. Moodle as a modular and customizable course management system, helps administrators and educators building their course the way they want. Educators use a basic structure, based on template, for building their thematic units so they can concentrate on the educational content. This homogeneity of the OUC's thematic units is preferred by the students, as they get familiar with the educational environment from the first thematic unit they attend.

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[1] https://moodle.org/

The process of deploying a new service or software to the eClass eLearning Platform is not a trivial task. It requires a detailed investigation of currently available solutions, along with an internal requirement gathering process (Christoforou, Rodosthenous, Epiphaniou, Mavrotheris, & Christodoulides, 2015). More specifically, a number of teams are involved, to ensure that the selected service or software will fit the OUC educational methodology and will be able to integrate with the rest of the eClass eLearning Platform infrastructure. Furthermore, the sustainability of the selected solution is examined, taking under consideration future enhancements, total cost of ownership and service support.

During the selection process, the project team gives priority to open source solutions that have a large community backing them up, good documentation and numerous installations in academic environments. Another major factor in the selection process, is whether the framework and the technology in general employed by the system, match the technology that the OUC team has expertise on. Examples of such solutions are Moodle, LAMS and the mobile application.

3.1 Asynchronous Learning service

One year after the offering of the first two Programs of Study, the eClass eLearning Platform was established. Up to that time, students and educators used the email service for communicating and exchanging educational content. The first core component of this platform was the Asynchronous Learning service that was based on the popular and well established open source learning platform, Moodle. This service was widely accepted by both students and educators since it allowed continuous access to knowledge resources needed for studying and numerous activities for collaboration and assessment.

Using this service, educators can build courses using an intuitive and friendly user interface with a plethora of tools available. More specifically, they have the ability to add files, folders, webpages, links and create HTML content. They also have the ability to create activities for assessment, collaboration and self-assessment. Furthermore, they can combine these activities and resource using a number of conditions and restrictions, like showing a resource only on a specific date or when one or more activities are completed.

Students have access to communication tools like forums, instant messaging and chat. These tools can be used in various ways; forums for instance, can be used by students to ask questions and get answers from their educators or their fellow students and for peer reviewing student coursework. Instant messaging can be useful for an educator to get in touch with students that don't participate in the course and may want counselling to continue their studies.

The eClass eLearning Platform handles knowledge resources from the OUC Library that hosts a large digital collection of knowledge resources (eBooks, journals, etc.) and numerous subscription based content from publishers. These knowledge resources are accessible through the eClass eLearning Platform using the bibliographic tool. In each thematic unit, the Academic Coordinators in collaboration with the librarians set the core and optional bibliography for the subjects taught. This bibliography is represented using the bibliography tool (Figure 1) and allows students to just click and view the resource, instead of searching for it using external search engines. This tool also allows the addition of content from the conventional collection through the Online Public Access Catalogue (OPAC), where students can click on a record, find the Library that it belongs to and book it.
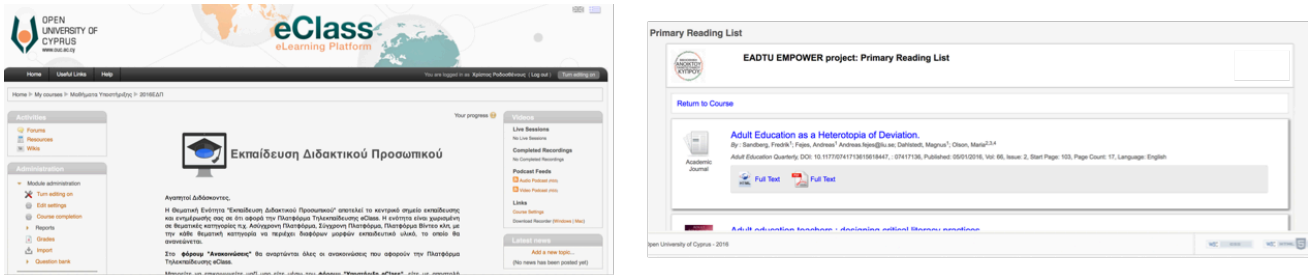
Figure 1 – Screenshots of a thematic unit (left) and the bibliography tool (right)

3.2 Synchronous Learning service

The blended education model used in the OUC for distance education, included a number of face to face meetings. The need for a more direct interaction between students and educators was apparent from the early years of the University operation. It was difficult for students to travel to a study centre and attend meetings. Two years after the offering of the first Program of Study, in 2008, the Synchronous Learning service was introduced. This service was based on Elluminate Live! Software (later Blackboard Collaborate™ [2]) that was one of the leading web conferencing software in education. This service, simulates a class-like environment enabling educators and students to attend virtual classes, chat, talk, exchange emotions, watch each other and many more. Most importantly, these meetings can be recorded and reproduced whenever they are required, an ability that is highly valued by the OUC's students. These unique qualities of the Synchronous Learning service made it an essential component of all Programs of Study in the University. In each thematic unit, there is at least one virtual classroom available 24/7 for students to join.

This service is also used for thesis and dissertation presentations. Presenting students, with their advisor being physically present join a virtual classroom and setup the presentation. The public can join the room and attend the presentation. These presentations are recorded and are then published as reference material to other students preparing for their presentations.
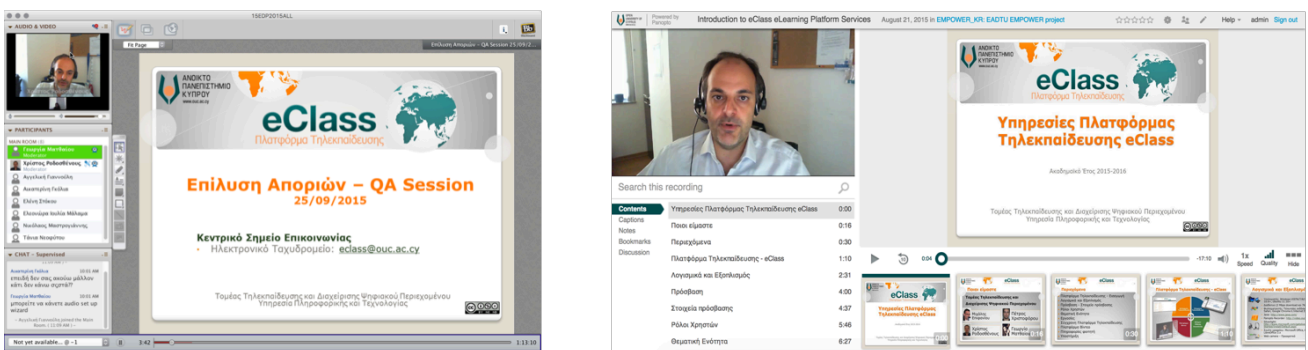

Figure 2 – Screenshots of a virtual classroom (left) and a lecture capture (right)

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[2] http://www.blackboard.com/online-collaborative-learning/blackboard-collaborate.aspx

3.3 Video Lecture and Streaming service

Video lectures are considered the most desirable educational content by students today. Coursera[3] students that study distance online courses using MOOCs (Massive Open Online Courses), prefer video content over any other type of content (Korkut et al., 2015). The use of video as educational content is proved to provide unique advantages both to students and educators such as increased satisfaction, enhanced understanding of content, ability to generate more comprehensive course notes and increased accessibility to students with disabilities (Newton, Tucker, Dawson, & Currie, 2014). All these benefits, along with the OUC's experiences from recorded lectures with the Synchronous Learning service, let the OUC to introduce the Video Lecture and Streaming service in 2015, which is based on the Panopto system[4].

Video Lecture and Streaming service is fully integrated with the eClass eLearning Platform. Educators can record, upload, edit and publish videos to their thematic units and students can view them from within their thematic units. Moreover, students can search for text in lectures, either written or spoken, using Optical Character Recognition (OCR) and speech recognition technologies. For example, a student can use the global search function to search for a specific word. When found, all occurrences of that word in captured lectures will be identified and will be clickable, so that students can watch the specific time point that this word appears. This service is also used to transmit live events and to create welcome messages and short training videos for supporting students or educators.

3.4 Assignment Submission and Plagiarism Detection service

During the Academic Year, students are required to submit a number of written assignments to successfully complete a thematic unit. These assignments are graded and count towards the final grade of the thematic unit. This process is conducted completely electronically using the eClass eLearning Platform. Educators publish the assignment subject in the thematic unit's central page and students start working on it. Before due date, students submit their assignment online. Educators grade the assignment and provide feedback to the student in a separate file.

From 2011, when the Plagiarism Detection Service was introduced, every submitted assignment is automatically checked for plagiarism. In earlier years, 2007 until 2010, the plagiarism check was done manually by the educators, using standalone plagiarism detection tools, course content and search engines. During that period, the number of students grew rapidly and manual plagiarism check became very difficult. The need for an integrated plagiarism detection service for helping educators was obvious (Rodosthenous et al., 2015).

When an assignment is submitted, it is automatically compared to more than 300.000 previously submitted student assignments, assignments submitted at that time in the same thematic unit or group, internet sources, content from publishers and content from the University Institutional Repository (Rodosthenous, Themistocleous, Mavrotheris, & Christodoulides, 2016). Plagiarism reports provide summarised and detailed information for each detected source and present both submitted and detected text side by side, highlighting the changes made in the submitted text.

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[3] https://www.coursera.org/
[4] https://www.panopto.com/

3.5 Learning Activity Management System (LAMS)

Continuous development in learning technologies and learning methodologies leads the development of new tools. This is the case of the Learning Activity Management System (LAMS) (Dalziel, 2003). LAMS is an open source learning environment which allows the design, management and provision of collaborate activities. It is fully integrated to the eClass eLearning Platform and it provides educators with a visual authoring environment for creating sequences of learning activities for their thematic units. These activities can be used for individual tasks or group work based on knowledge resources and collaboration.
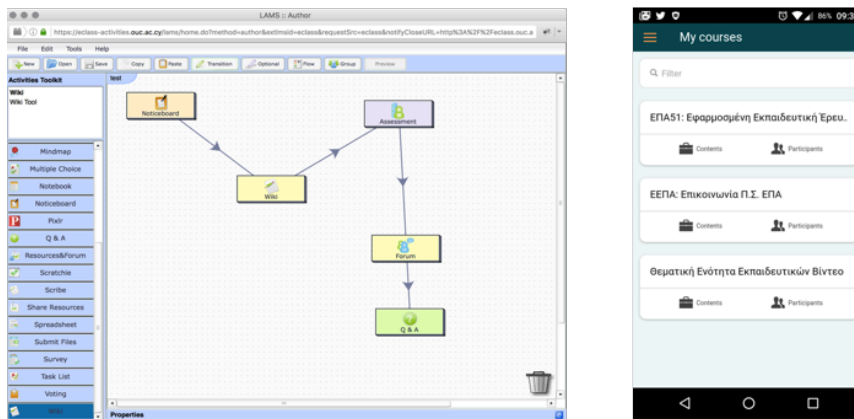

Figure 3 – Screenshots of the LAMS design screen (left) and the mobile app (right)

3.6 Mobile Learning

The increasing use and penetration of mobile devices in our daily lives couldn't leave the academic community untouched. Following this technological trend and its benefits of accessing content from anywhere, the OUC proceeded with the development of mobile learning tools, where students can view their courses and participate using their smartphones or tablets. The custom design "OUC eClass" application is based on the Moodle Mobile application[5], and it allows students, using both iOS[6] and android[7] devices, to have access to all knowledge resources and activities in their thematic units and get notifications on their smartphones when a classmate or educator posts in the forum or adds a calendar event. Students can also watch live or on-demand content using the Video Lecture and Streaming service application or join a virtual classroom using the Synchronous Learning service application.

4. Technical infrastructure

An academic environment, and more specifically a distance education University, requires a powerful infrastructure to support the various services offered to the academic community. Distance education also requires that services are available continuously worldwide, so an infrastructure that allows 24/7 operation and continuous access to all eLearning services from external networks should be present.

The OUC currently has a datacentre physically located in its premises that hosts all active equipment needed for hosting its eLearning infrastructure along with the rest of the administrative services' infrastructure. There

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[5] https://download.moodle.org/mobile/
[6] https://itunes.apple.com/us/app/ouc-eclass/id1063671590?mt=8
[7] https://play.google.com/store/apps/details?id=ouc.test.id&hl=en

is also a secondary datacentre and in case of a catastrophic failure in the primary site, all critical operations will resume from there. This infrastructure is also connected to a number of cloud based services. For hosting the eLearning services, a number of web and database servers are employed in a clustered environment, that allows load balancing and redundancy. The majority of servers are hosted on a Linux based Operating System running the Apache web server software and MySQL databases.

The growth of the organization, both in terms of students and thematic units, required flexibility in scaling and sizing of the infrastructure, i.e. being able to allocate extra resources on specific services (storage, memory or processing power) on certain time points or even provide extra bandwidth for live broadcasting a major event or lecture. This flexibility got possible after the deployment of the OUC's virtual infrastructure. Both the server and the network infrastructure are presented in terms of abstract entities called virtual servers and virtual network respectively, which are independent of the physical infrastructure hosting them.

A large number of resources is dedicated to preserving historical data. The thematic units of each Academic Year are archived and stored on a separate server that allows limited access to content in read-only format. This allows easy search and retrieval of content used in previous Academic Years.

4.1 eLearning and multimedia auditoriums

At the OUC premises there are two eLearning and multimedia auditoriums used for conducting physical or hybrid group meetings, personnel training, thesis presentations and small events. Each auditorium is equipped with an automation system that allows all equipment to be centrally controlled from a tablet. The tablet's software is designed to help novice users to use the equipment by just selecting a usage scenario which activates only the equipment needed for that specific scenario. For example, the remote presentation scenario activates the auditorium's computer, HD cameras, interactive board and all the microphones. Video and audio feed is automatically transferred to the computer and hence to the Synchronous Learning service and the Video Lecture and Streaming service.

4.2 Integration of eClass with the OUC infrastructure

The eClass eLearning Platform is integrated to a number of services, including the OUC Library Information System (LIS), the "Kypseli" Institutional Repository, the Identity Access Management (IAM) system, the Single Sign On (SSO) system, the Student Information System (SIS) and the Enterprise Resource Planning (ERP) system. These integrations, allow the exchange of data (i.e. student and educator records, educational content etc.).

In each Academic Year, new and current students are enrolled in thematic units through the SIS. When this process is completed, student data are processed by the IDM and user provisioning occurs. In case of newly enrolled students, an email account is created and access to eClass, Kypseli and LIS is provisioned. Educators are recruited through the ERP system and their records and data are forwarded to the IDM for account creation and provisioning. More specifically, email accounts are created for each educator and provisioning on each system takes place.

The completion of the above process marks the beginning of the student enrolment to thematic units in eClass eLearning Platform. Each thematic unit is created based on data that are forwarded from the SIS, i.e. its offering in the present Academic Year, full name, short code, semester and description. Next, data from the ERP, i.e. educator placements and groups are sent and each user gets the appropriate course role (i.e. Tutor,

Coordinator, Academic Coordinator etc.). A similar procedure takes place in the SIS and for each thematic unit the student is enrolled in, he or she is given access to the corresponding thematic unit and group in eClass.

In eClass, coordinators are responsible for organizing and building the thematic unit. That is, both the structure and educational content. It is important and useful for educators to have the ability to search and add content from the institutional repository or the LIS system in each thematic unit. More importantly, educators can add theses, digital artefacts and books from the repository and distribute them in each week or theme inside the course. When students access this content, they will be automatically authenticated through the SSO system.

Integrating systems and allowing data transfer in a controlled environment through a workflow is not a trivial task. Each system's data are stored in a certain way and it is not easy to just send a record from one system to another. Each system keeps its data in a non-standard repository, and great effort is needed for extracting them and manipulating them. The majority of these systems provide an API or a web service (SOAP or REST), and for those that do not, another layer is added for exposing their API and functionality through a custom web service. Currently, all systems communicate with each other in a secured isolated network using an encryption algorithm for protecting the transferred data from possible attackers or eavesdroppers.

5. Support model

Although state-of-the-art hardware and best-of-breed software are mandatory elements for a successful distance education infrastructure, none of these would stand alone without a targeted and consistent training and support model for all users. This is identified in several researches that investigate the critical success factors (CSFs) which must be met for the acceptance of the deployment and operation of an eLearning project. According to Al-Busaidi & Alshihi (2010), faculty believe that these CSFs are related to the educator, technology and organization, that includes training, organization and technical support, while in Siritongthaworn, Krairit, Dimmitt, & Paul (2006), the crucial factor is identified as organization's policy and support for resources and training and in Bhuasiri, Xaymoungkhoun, Zo, Rho, & Ciganek (2012), infrastructure and system quality was the most important consideration for eLearning success. Technical support, as a CSF for the acceptance of eLearning, has a direct effect, according to users, on ease of use and usefulness of the technology (Sánchez & Hueros, 2010), while training can change users' attitude towards accepting and adopting new technologies (Boothby, Dufour, & Tang, 2010).

For educational technology to be successfully adopted, it needs support in each phase of the adoption and operation cycle (Moser, 2007). The phases of end-user training are identified as initiation, formal training and post training (Compeau, Olfman, Sei, & Webster, 1995; Gupta, Bostrom, & Huber, 2010). The initiation phase firstly identifies the training needs and then the training environment is designed. The formal training phase is where the actual training is conducted and in post-training phase the evaluation of the training and the support of trainees is carried out.

Since the first day of the deployment of the Asynchronous Learning service (Moodle), the OUC has invested in the engagement of users to meet their needs. User engagement methodology is based on a number of theoretical models like Technology Acceptance Model (TAM) and service support is the last phase of this methodology (Epiphaniou, Rodosthenous, Christoforou, Mavrotheris, & Christodoulides, 2015). Furthermore, we have analysed service support, to address the adoption cycle of the educational technology to OUC's needs, by designing a three-phases support model. This model completes the cycle of a whole Academic Year. These phases are interconnected, in an on-going procedure, having first the pre-academic year support, second the support during the Academic Year and last the post-academic year support.
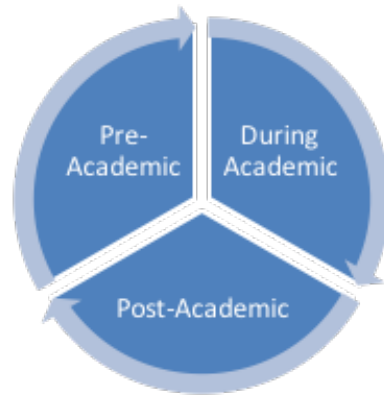
Figure 4 - Three phases support cycle model

5.1 Pre-academic year support

End-user support starts by defining the needs of our stakeholders i.e., the Academic Coordinators of Programs of Study, the Coordinators of thematic units and the governance of the University. Meetings are scheduled just after the end of the previous Academic Year and through a semi-structured interview process, user requirements are identified. These requirements are then presented in a document, that is communicated to the Academic Coordinators for their agreement on behalf of their Program of Study. Alongside this procedure, meetings are also being held with other sectors of Information and Communications Technologies Service, as with other administrative departments that are involved in the preparation process for the Academic Year like the Library Service and Students Welfare Service.

Infrastructure support includes all the necessary upgrades, updates of hardware and software systems. Each change is documented in the knowledge base system and all necessary modifications to the manuals are applied or new ones are created. Manuals are prepared for all the available operations in the eClass eLearning Platform. Furthermore, short step-by-step manuals for procedures that were identified as "most used" by users during the years are compiled. Following the advancement of technology, webcasts are now a key part for supporting end-users, as most of them prefer to watch a short explanatory video instead of reading piles of text in a document. Webcasts are being prepared using the Video Lecture and Streaming service, making them a good example of how educators can use this service to prepare their own lectures and videos to be used in thematic units as educational content and knowledge resources.

During the period between Academic Years, Academic Coordinators and Coordinators, with the support's help, build their thematic units. During this process, they have the option to reuse educational content from previous Academic Years or even restore a complete thematic unit in its previous form and edit its content. Structure is maintained according to the agreement document from previous meetings and the academic calendar that is published. For emphasizing certain topics, training seminars are arranged additionally to all manuals and webcasts. Key users are trained more thoroughly in operations needed for building thematic units and not just using them. As the number of available tools and services offered increase, more specialized training and more frequent meetings are required.

5.2 During the Academic Year support

Huge part of the support during the Academic Year is being held at the beginning of it. This is the busiest time of the year for helpdesk support with ticketing, email and phone support having a huge traffic. Some of the most common problems of that period include resetting student passwords and troubleshooting software installation. A plan of specific steps is prepared at the start of Academic Year aiming to reduce the load of the first month. This plan includes training seminars on target groups and Question & Answer (QA) sessions for all educators, with both of them organized and conducted through the Synchronous Learning service. This is another example of how a training seminar can be used to learn the software that is being used for the virtual classrooms. Newsletters are regularly sent, informing users with important announcements about new features, critical updates, changes affecting them and for promoting new technologies.

Special thematic units are created for students and educators respectively. These thematic units are built by following the same structure as with all the other thematic units of the University. Their purpose is to become the central location for everything related to the support of the eClass eLearning Platform. Each thematic unit is organized in themes that correspond to the services offered. Each theme has all the necessary support content concentrated under it in the form of webcasts, files, links and webpages. Web conferencing rooms are available for the whole Academic Year and all the training seminars take place there. Each training seminar is recorded in order to allow users to watch it later at their own place and time. Last but not least, a number of frequently asked questions (FAQs) is made available in the form of wikis and forums. Forums are also used by users who ask support questions and cooperate with others having similar issues and needs.

5.3 Post-academic year support

Towards the end of the Academic Year, feedback is collected regarding user experience with services of the eClass eLearning Platform. To collect feedback, users are asked to complete a questionnaire and some of them are interviewed to express their reactions, feels and opinions about the eLearning Platform. The interviews with stakeholders that are conducted in pre-academic year support phase are used to clarify issues faced during the previous Academic Year. Post-academic year support continues with the categorization of problems by analysing helpdesk support calls and tickets. Furthermore, reviewing of learning analytics is an important part of the post-academic year support. These analytics are used to identify possible problems during the Academic Year, to monitor the performance of students and measure learning tools usage.

6. Statistics and usage metrics

For monitoring the usage of services and user engagement in the eClass eLearning Platform, there is a series of monitoring mechanisms in place, that capture these details and present them to the educators and the Academic Coordinators of each Program of Study. In the following paragraphs, a list of statistics and metrics are presented for some of the core platform services. These statistics cover the Academic Year 2015-2016.

6.1 Asynchronous Learning Platform

Among the many advantages of using Moodle as the Asynchronous Learning service, is the ability to track users from the logging system. Figure 5 shows the number of thematic unit accesses per week day and time of day for the whole Academic Year. Monday is the day with the most thematic unit accesses and afternoon and

evening is the most common time for studying at the OUC. This behaviour is expected, since the majority of OUC students are working people with family obligations.
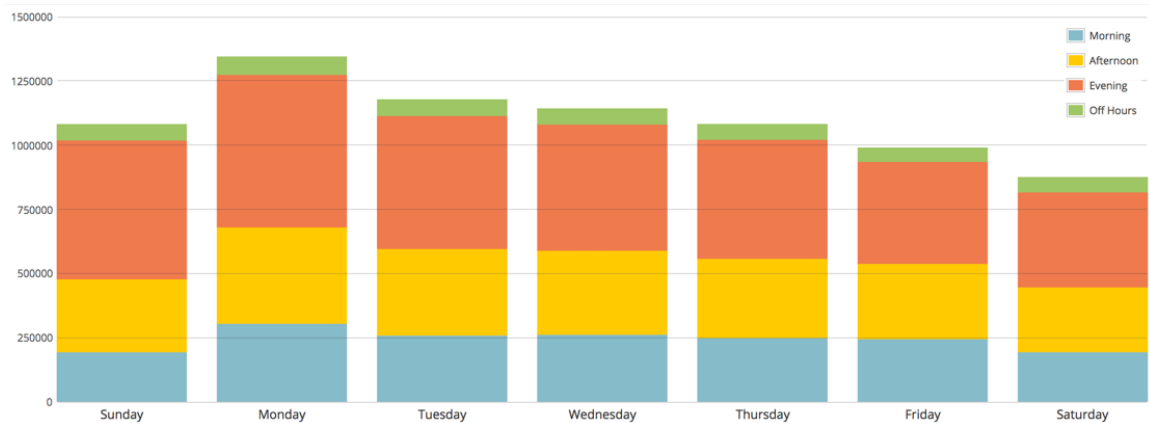

Figure 5 – Thematic unit accesses per week day and time of day

Forum is one of the most used activities. Users have created 12764 discussions and added 37778 posts during the Academic Year. More specifically, students have posted 23948 times, while thematic unit Coordinators have posted 7635 times during the Academic Year.
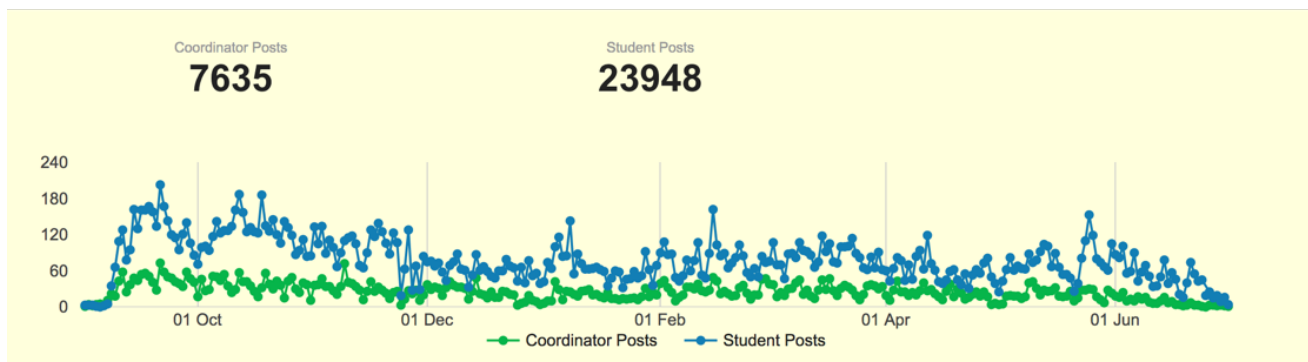

Figure 6 - Students and Coordinators posts in forums during the Academic Year

6.2 Synchronous Learning service

During the Academic Year 2015-2016, 775 virtual classrooms were created and 22421 sessions took place with a total number of 75977 participants. 3640 of these sessions were recorded (16.23%) for later viewing. These recordings were accessed 128375 times from students and educators. In total, 93% of total attendances were from a desktop device, in contrast with 7% that were made from a mobile or tablet device. Even though the mobile device usage is low, the ability to use a mobile device to join a session is a major advantage, since it allows students to join a virtual classroom even when they are away from home or office.

In Figure 7, the number of rooms and recordings per month is depicted. The majority of sessions (6455) took place in September, at the start of the Academic Year, where educators got in touch with their group of students for mentoring, collaborate to prepare lectures and OUC personnel to organise training events. The number of recordings per month was approximately 400 (excluding the examination period of June).
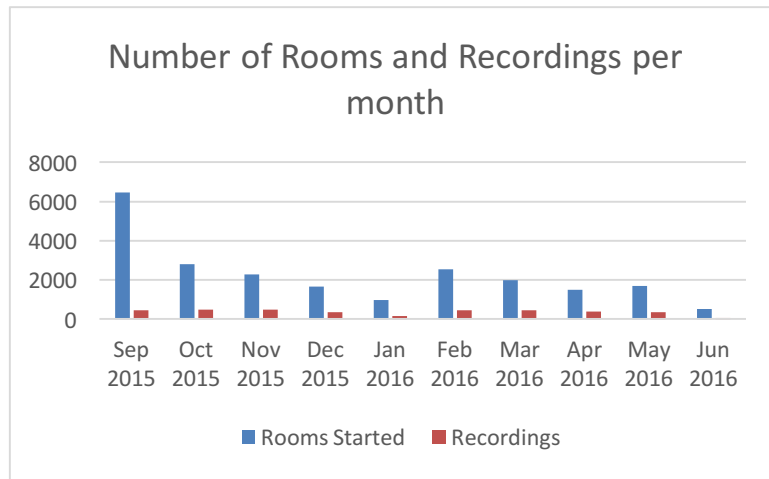
Figure 7 - Number of Rooms and Recordings per month

6.3 Video Lecture and Streaming service

Even though the ability to capture lectures and create videos is a newly introduced service, a number of educators have embraced it and created more than 700 sessions of around 592 hours of content (Table 1).

Table 1 - Video Lecture and Streaming Platform usage statistics

Number of sessions	705
Hours Recorded	592.39
Total number of views	17785
Hours Viewed	1101.81

The Video Lecture and Streaming service has a built-in functionality for monitoring viewers in each session. More specifically, a detailed graph with viewers per lecture time is presented to the educator (Figure 8). By analysing this graph, educators can understand if their lecture is interesting and what parts of the lecture are most viewed.
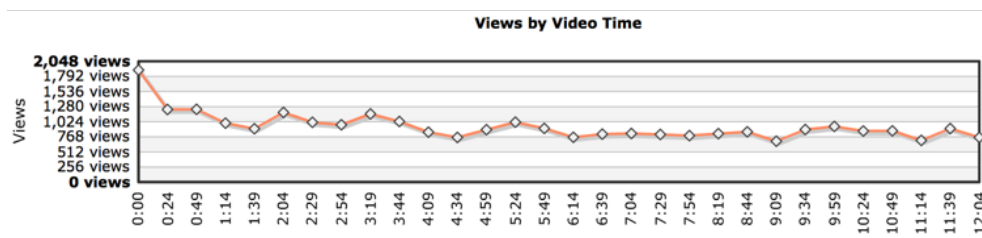

Figure 8 - Number of views per video time. Analytics from a student training video.

An example of lecture capture analytics is presented in Figure 9, where the student training video sent at the beginning of the Academic year was viewed more than 1000 times in that period (Figure 8). For the rest of the period, only few users needed to watch it, except from the beginning of the second semester where a peak is

detected in the graph. Moreover, the first 24 seconds of the video were skipped by several users, since the content at that time period was just an introduction that most of the users were familiar with (Figure 9).
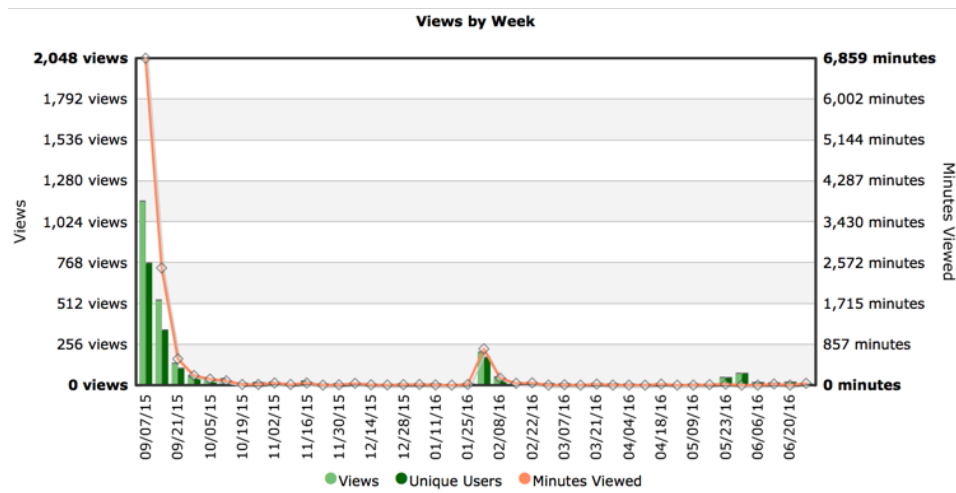

Figure 9 - Number of views and minutes watched. Analytics from a student training video

7. Conclusion and Future work

The Open University of Cyprus, as a newly established academic organization, acknowledged from the beginning of its operation the advantages and possibilities of technology in education and especially in distance education. This direction helped the organization to keep its attention towards enhancing its learning methodology with new technology advancements. OUC's policy for adopting new technologies and moreover the successful introduction of services and their adoption from students and educators, helped the eClass eLearning Platform to grow to an innovative integrated solution with a plethora of services.

In this work, the eClass eLearning Platform is presented with emphasis to its core services offered. Moreover, details are given on how each of these services fit the learning methodology used in the University. Also, the infrastructure used to empower the distance education experience in the Open University of Cyprus is described along with the extended support model provided for educators and students.

Organizations like the OUC, that depend on technology, have to coop with educational technology advancements. Future technologies like advanced learning analytics, adaptive learning and virtual reality (Johnson, L., Adams Becker, S., Estrada, V., and Freeman, 2015) may find their space in higher education and OUC should be ready to adopt them in its learning methodology and respectively in its eClass eLearning Platform.

8. References

Al-Busaidi, K., & Alshihi, H. (2010). Instructors ' Acceptance of Learning Management Systems: A Theoretical Framework. *Communications of the IBIMA*, 2010, 1–10.

Bates, A. W. (2005). *Technology, E-learning and Distance Education*. Abingdon: Routledge

Bhuasiri, W., Xaymoungkhoun, O., Zo, H., Rho, J. J., & Ciganek, A. P. (2012). Critical success factors for e-learning in developing countries: A comparative analysis between ICT experts and faculty. *Computers & Education*, *58*(2012), 843–855.

Boothby, D., Dufour, A., & Tang, J. (2010). Technology adoption, training and productivity performance. *Research Policy*, *39*(5), 650–661.

Christoforou, P., Rodosthenous, C., Epiphaniou, M., Mavrotheris, S., & Christodoulides, C. (2015). Deploying New Services in the Open University of Cyprus Elearning Platform - Our experiences. In *INTED2015 Proceedings* (pp. 6108–6116). Madrid: IATED.

Compeau, D., Olfman, L., Sei, M., & Webster, J. (1995). End-user training and learning. *Communications of the ACM*, *38(7)*, 24–26.

Dalziel, J. (2003). Implementing learning design: The learning activity management system (LAMS). In Interact, Integrate, Impact: Proceedings of the 20th Annual Conference of the Australasian Society for Computers in Learning in Tertiary Education. Adelaide.

Epiphaniou, M., Rodosthenous, C., Christoforou, P., Mavrotheris, S., & Christodoulides, C. (2015). Engaging Users in Distance Education - the Case of the Open University of Cyprus. In *INTED2015 Proceedings* (pp. 6092–6101). Madrid: IATED.

Gupta, S., Bostrom, R. P., & Huber, M. (2010). End-user training methods: What We Know, Need to Know. *The DATA BASE for Advances in Information Systems*, *41*(4), 9-39.

Johnson, L., Adams Becker, S., Estrada, V., & Freeman, A. (2016). NMC *Horizon Report: 2016 Higher Education Edition*. Austin, Texas: The New Media Consortium.

Korkut, S., Dornberger, R., Diwanji, P., Simon, B. P., & Märki, M. (2015). Success Factors of Online Learning Videos, *9*(4), 17–23.

Moore, M. G., & Kearsley, G. C. (2011). *Distance education: A systems view of online learning*. Cengage Learning.

Republic of Cyprus. (2002). Law providing for the establishment and operation of the Open University of Cyprus L.234(I). Nicosia.

Rodosthenous, C., Christoforou, P., Epiphaniou, M., Matheou, G., Mavrotheris, S., & Christodoulides, C. (2015). Plagiarism Detection and Prevention – Experiences From the Open University of Cyprus. In *EDULEARN15 Proceedings* (pp. 1348–1355). Barcelona: IATED.

Rodosthenous, C., Themistocleous, P., Mavrotheris, S., & Christodoulides, C. (2016). Developing an Academic Institutional Repository. The Case of the Open University of Cyprus. In *EDULEARN16 Proceedings* (pp. 1175–1183). Barcelona: IATED.

Sánchez, R. A., & Hueros, A. D. (2010). Motivational factors that influence the acceptance of Moodle using TAM. *Computers in Human Behavior*, *26*(2-1o), 1632–1640.

Siritongthaworn, S., Krairit, D., Dimmitt, N. J., & Paul, H. (2006). The study of e-learning technology implementation: A preliminary investigation of universities in Thailand. *Education and Information Technologies*, *11*, 137–160.

Zellwegwr, F. (2007). Faculty adoption of educational technology. *EDUCAUSE quarterly*, 30(1), 66–69.