DEPLOYING NEW SERVICES IN THE OPEN UNIVERSITY OF CYPRUS ELEARNING PLATFORM – OUR EXPERIENCES

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Abstract

The eClass eLearning Platform (eClass) is the main educational tool of the Open University of Cyprus (OUC), used for facilitating online teaching and learning. Selecting and deploying the best alternative among different candidate services is a major challenge that requires in depth knowledge of the educational process, educators and students needs and all the available solutions. The outcome of this procedure is the introduction of a service that is integrated into eClass. The scope of this paper is to describe and elaborate on the procedure used for the selection and deployment of new services in eClass. Authors provide a description of eClass followed by an analysis of the procedure used to introduce a new service. Next, we report on the deployment phases and challenges faced during each step. Specific project implementations are presented for demonstrating the eClass components. We conclude by presenting the results of a user satisfaction survey of the deployed services.

Keywords: eLearning, eLearning platform, synchronous, asynchronous, video, lecture capture, plagiarism detection.

1   INTRODUCTION

"The choice of technology should be driven not by its novelty but by the needs of the learners and the context in which we are working" [1]. Evaluating, selecting and deploying a technology not suitable for our learners and tutors can be very destructive for the whole organization, both economically and prestigiously. This process is particularly challenging in our educational organization, Open University of Cyprus (OUC), which is the only public University in Cyprus dedicated to Distance Education. As a public University, we are obliged to follow all public procurement procedures and in combination with our commitment to Distance Education this can be very limiting, when searching for technologies that fit the needs of the University and its stakeholders [2].

The OUC is a relatively young University, which is expanding rapidly. In just nine years of operation, OUC has grown its students from 162 in 2006 to approximately 4.800 students in 2014 and the programmes of study from 2 to 21. Recently the Ministry of Education and Culture established OUC's leading role as the coordinator of Distance Education in Cyprus, by offering joint degrees with all the other Universities in Cyprus, in languages other than Greek, based on the distance learning educational methodology. The eClass eLearning Platform (eClass) is the main educational tool used for facilitating online teaching and learning and combines a set of technologies integrated into a unified system. The selection and deployment of new services, aim at integrating them with eClass.

2   THE OUC EDUCATIONAL ENVIRONMENT

2.1   Educational model

2.1.1   Typology

Based on Keegan's typology [3] of distance teaching systems, OUC is an autonomous distance teaching institution. OUC offers accredited distance education undergraduate and postgraduate degrees, based on European Credit Transfer and Accumulation System (ECTS).

2.1.2 Students and tutors

The majority of our students are located outside of the campus, mainly in Greece and Cyprus, as most of our programmes of study are taught in Greek. Students have an average age of 35 and they are adult learners already working and searching for a second opportunity or enhancement of their qualifications. During the last three years, the OUC started focusing on younger ages by offering undergraduate degrees, taking advantage the economic crisis and the nature of the University that does not require students having face-to-face classes like conventional universities. Students for every course are separated into groups of approximately 25 per group and have a tutor responsible for monitoring the group, answering their questions and providing them with feedback for their assignments and exams. Currently, the OUC has around 300 tutors who are mostly part-time educational personnel, located also in Greece and Cyprus, as there are only 18 fulltime faculties working at the University.

2.1.3 Face-to-face meetings

The OUC provides Distance Education to students in a way that they can complete all their learning outcomes from their home and they are required to come to a physical class only once, for taking their final exams. In addition to that and following the practice of blended learning [4], University organizes a number of face-to-face meetings for each course that are not mandatory, but are important for the students to get to know the tutor, their classmates, the learning material and the learning methodology. The University understands the significance of direct communication between students and tutors and encourages its students to participate to these meetings. At the same time, realizing the difficulties coming from its distance nature and students personal and work obligations, it offers some or all of these meetings through eClass, in the form of web conference meetings (live or recorded).

2.2 EClass eLearning Platform

EClass is a mixture of different systems and services, designed to operate as a unified learning environment. Excluding the email service, eClass is the only educational medium used in OUC to facilitate the educational process. User roles in eClass match those of the educational model. This decision makes it easier for our users to understand the academic hierarchy and the way it works.

2.2.1 Asynchronous communication

EClass's main component for facilitating the asynchronous communication and course delivery is Moodle [5], [6], the open source learning platform guided by social constructionist pedagogy and designed to facilitate both teaching and learning. In OUC, Moodle is our core system. Moodle was installed in 2007 and is maintained throughout the years exclusively by the University's eLearning Team. Moodle offers a plethora of tools ranging from educational content tools (files, folders, links, webpages) to communication and collaborative tools (forums, calendars, wikis, blogs) and student assessment tools (assignments, questionnaires, quizzes).

2.2.2 Synchronous communication

Synchronous communication is provided through the Blackboard Collaborate Web Conferencing (former Elluminate Live!)[1], a platform that exists on premises of OUC since 2009. Synchronous platform is fully integrated in Moodle and our users access their live or recorded meetings from their course, having the feeling that synchronous communication is just another feature of Moodle. Blackboard Collaborate offers a wide range of features like audio, video, whiteboard, presentation, file transfer, application sharing and chat, in a successful effort to simulate the experience a student would have in a class having a face-to-face lesson.

2.2.3 Student assessment

Student assessment is of high importance in OUC because as a Distance Education University all student assignments have to be prepared at student premises and submitted to their tutors for grading and feedback. The whole process of assignment submission and assessment is completed in Moodle with the enhancement of Ephorus[2], a plagiarism detection service operating in eClass from 2010.

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[1] Retrieved from http://www.blackboard.com/Platforms/Collaborate/Overview.aspx on 25/01/2015

[2] Retrieved from https://www.ephorus.com/ on 20/11/2014

Currently, the OUC has a database of thousands of assignments and dissertations. Practically, all the assignments, students have sent since the University's operation are indexed and made available for plagiarism check. This tool is very useful to the hands of our tutors.

2.2.4 Video services

Video services is an ongoing project, allowing the OUC to broaden its educational content by adding audio and video, giving to our users a more familiar and easy way to reach the information and the learning outcomes. From the beginning, we have used different media streaming services like Windows Media Server or Adobe Media Server. Video content was embedded in the courses and users were able to reproduce it using the integrated player. Our goal is to present a service fully integrated in eClass that will operate both as a video portal and as a lecture capture system.

2.3 Organizational model

As stated previously, the OUC is a public University operating under the laws and regulations of the government of the Republic of Cyprus. The OUC has on top of the decision making pyramid, its Governing Board appointed by the President of Cyprus every 3 years. Under the Governing Board, there are two distinctive groups of employees, administrative personnel and faculty. Faculty is organized in three schools that offer the programmes of study while administrative personnel are organized in units. ELearning Team belongs to the ICT and Library Unit. Regarding the decision making process three different official project committees (requirements, evaluation and acceptance) must be appointed by the Board of Tenders and Procurements to run the public procurement procedure. All the decisions and the intermediate steps are evaluated by the Audit Office and the Treasury of the Republic of Cyprus.

3 METHODOLOGY FOR INTRODUCING A NEW SERVICE TO ECLASS ELEARNING PLATFORM

A growing organization must constantly evolve its core-services and incorporate new technologies to enhance them. The OUC is such an organization and for keeping up the pace with the technological advances and the new pedagogical models, it introduces new services to facilitate the needs of its stakeholders [6]. The introduction of a new service follows a specific methodology. This methodology resulted from the mixture of international acceptable methodologies [7], [8], standards, best practices and OUC's specific requirements and constraints. It was tested and enhanced with experiences and challenges faced through its application in several projects the last years. The methodology followed by OUC, consists of four discrete steps that are depicted in Figure 1.
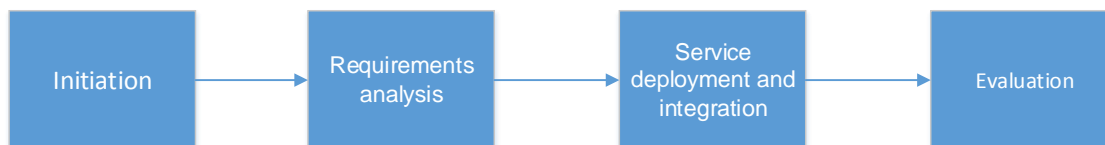

Figure 1 - Phases for introducing a new service

3.1 Initiation

This early phase includes the conceptualization of the service. Bates [1], proposed the ACTIONS (Access, Costs, Teaching and learning, Interactivity and user-friendliness, Organizational issues, Novelty, Speed) framework for deciding if a technology is right for the organization. This model is a great tool for aiding the decision-making process.

Members or groups in the OUC present ideas for new services based on educational trends, best practices from other Universities, OUC Strategic Plan and the Educational Model followed. This internal process involves a number of stakeholders including members of the eLearning Team, Chief Technology Officer (CTO), Chief Executive Officer (CEO), Library and Information Systems committee, Faculty members etc.

These ideas are documented in a list of services that could be deployed in eClass. An example of such a list could contain services like video services, plagiarism detection services or a student collaboration service. The eLearning Team prepares a feasibility study for each item on that list. This study includes:

- An estimation of the technological environment needs (Hardware/software/network infrastructure),

- Educational methodology relevance,

- An estimation of the human resources needed for the design, deployment and support,

- An estimation of the economic resources needed (budget) and,

- The possibility of the service to integrate with eClass.

At this stage, all ideas for candidate new services and the feasibility study, are included in the service initiation report and are forwarded to the decision making body of the organization for further investigation and approval.

3.2 Requirements analysis

This second phase starts after the approval of the service initiation report. A project team is set with the responsibility to prepare detailed specifications, investigate possible solutions and products for the new service to be included in eClass and deploy the new service using the selected solution. The project team verifies the earlier findings of the service initiation report by interviewing the stakeholders. These interviews include topics and questions like possible usage of the new service, constraints, adaptation of the new service to the educational methodology, time needed for familiarization with the new service etc. The project team proceeds with a market research to detect candidate products or solutions that match the basic requirements of the new service. During this process, the following information regarding the product or solution is gathered:

- the technological platform of the service,

- the framework-programming language,

- the supported operating systems,

- the supported devices (mobile, tablets, workstations),

- the organization/company that supports the service,

- the number of organizations that have already deployed the service,

- an estimation of the amount of time and effort needed to deploy and support the service,

- the ability of the service to integrate with eClass,

- the supported languages of the service,

- the Total Cost of Ownership (TCO) and

- the Return of Investment (ROI).

First, the project team contacts suppliers and service providers that have collaborated with the University in other projects and are recognized to have the required expertise and solutions that match the criteria set for the new service. The next step is to publish a Request for Information (RFI) to European and International fora, so that companies or other organizations can propose solutions that match the criteria set for the new service. The outcome of this process provides a good indication whether there is a well-established market space, expertise and available solutions that can be used for the deployment of the new service.

The project team gathers all input and proceeds with the requirements specification document of the service. A major part of the requirements specification document is about the integration of the solution with eClass. Solutions must be able to integrate with eClass authentication module and course management module. This allows our users to have a single login and single point of entry to our platform across all its modules.

Another major part of the requirements for the new service is the supporting material and training. Any new service deployed to eClass must have adequate documentation for its users to use it. This documentation includes user guides to describe the new service functionality to each group of users, short guides for users to be able to quickly perform specific functions and webcasts for users that are not familiar with the service and need step by step guidance. Documentation is designed in such a

way that is unified for the whole platform and explanatory enough to use it without getting lost in the content.

3.3   Service deployment and integration

The next phase is the implementation and deployment of the new service. The project team is responsible for choosing the more appropriate method for the deployment among three alternatives; in-house development, outsourcing the process though public procurement procedures [9] or a mixed model. All three methods have been studied by a number of researchers and the decision on which one is best can be taken after examining a number of factors [10], [11], [12].

In case of in-house development, we prefer to use widely accepted open source software [13] that has a number of advantages. The most important are: the solution must have a well-established community that supports and use it, the programming language/framework it uses should preferably match that of our technology's stack, the eLearning Team should have expertise on using it and modifying its source code and the solution must be scalable and expandable. In case of outsourcing, the project team prepares all the necessary documents for the publishing of a public tender. The third option is a mixture of the other two, where the project team decides that the benefits of the in-house development are more but there is a lack of human and technological resources at the University at that specific time point that requires an outsider to join forces with University personnel to complete the project.

The outcome of all three options is the development of a solution integrated with eClass. This outcome is not finalized until the successful completion of a series of scenarios affecting the operation of the service and a pilot period during which all deficiencies found are corrected. The project team runs a series of scenarios and tests to verify that the new service was deployed as expected and that all requirements sets are met. Successful completion of the tests marks the beginning of the pilot period. Service delivery is performed in steps. First, a small group of users and programmes of study have access to the service for a certain period. After this period, the solution's behaviour is examined. Depending on whether the solution is stable and users do not report problems with it or with the rest of eClass, the service gets final and proceeds to evaluation phase.

3.4   Evaluation

The deployment of a new service is not a once off procedure, but it is rather a dynamic process where the service is evaluated through time for its usage, user engagement [14], technical problems faced, applicability to the pedagogy model [15] and usability [16]. More specifically, for evaluating technical problems we gather all support tickets which are relevant to the deployed service, and export statistics i.e., the rate of issue occurrence, top technical issues etc. This action gives us a good indication of the problems a user had while using the service. In addition, the number of help requests is a good indication for the quality of the supportive documentation of that service. Many users asking the same question is probably an indication that users did not understand what the documentation tried to deliver or they did not read it at all. Either way, the purpose of this evaluation is to locate the areas that are problematic and proceed with a solution to minimize or eliminate the problems.

4   DEPLOYING THE SYNCHRONOUS LEARNING SERVICE – AN EXAMPLE

The above methodology was used since the early beginning of the University. The first eLearning service deployed at OUC was the LMS [17]. After that, the synchronous learning service was deployed followed by the plagiarism detection service and the video services. We are in the process of deploying a lecture capture system and virtual labs that will be used by the Faculty. The following sections describe in detail how the methodology presented in Section 3 was applied for the deployment of the synchronous learning service.

4.1   Synchronous learning service deployment and integration

In 2008 the University started growing in numbers. The number of programmes of study had increased while the same had happened to the student enrolments from Greece. A LMS seemed not enough for communication and interaction since students were attached to the traditional model with physical lectures and discussions that required them to use methods like email and phone calls. These changes forced the University to enhance its educational methodology in order to offer everyone an equal chance of studying. Virtual Meetings were introduced in addition to face-to–face meetings to

allow people from every corner of World to participate. In addition, the fact that many of our students were working, made it even more difficult for them to attend face-to-face meetings. Furthermore, students requested to have a more interactive method for teaching instead of text based educational material.

These needs led to a synchronous learning service initiation document that included a feasibility study for the service. This study presented an estimation of the number of computational resources and the bandwidth needed for the new service, a proposal for the adaptation of the new service to the educational methodology, the number of experts needed to design, deploy and support the new service, a rough estimation of the budget and a preliminary check that the service could integrate with eClass. The decision making body of the University agreed that this service should be deployed and a project team was assigned the task of designing and deploying this service.

The project team proceeded with an official project plan setting the time-frame for the new service deployment to be 9 months analysed in 3 months for implementation and 6 months pilot use. The core functionality of the new system was documented and topics like the bandwidth needed, interoperability, accessibility, sound and video quality, file transfer, presentation upload and classroom management where covered in detailed. A number of constraints were added to the specifications document, like the need for a hardware free solution for the clients, support for Greek language, support for low bandwidth connections from client side, integration of the solution to eClass and hosting in the University's datacentre. Every member of the Faculty was interviewed to verify the requirements and clarify the possible ways that this service could be used in the educational procedure.

At this stage, the project team prepared and published an RFI to investigate possible solutions. A number of organizations/companies responded to the RFI, presenting products like Saba Centra, Cisco WebEx, Dim Dim, Wimba and Elluminate Live. Due to the complexity of the solutions and the critical role of the service, a demonstration was prepared for each product to clarify its features and potentials and of course test it live. The outcome of this demo was that only 2 of the products mentioned earlier met the core requirements set by the project team.

The project team decided that the most appropriate procedure at that moment was to proceed with a public tender. A tender procedure was prepared and the company offering the Elluminate solution won. The Contractor immediately proceeded with the design and installation procedures. A major milestone of the project was its integration with eClass. OUC required that users must be able to join a virtual meeting from their course with the click of a button, without having to login to a new system. At this point, the eLearning Team intervene to provide guidance and technical expertise for the correct implementation of this functionality.

The final step in the delivery of the new service was the preparation of the necessary documentation, supporting material and training by the project team. Due to the large number of functions, we decided to provide three short guides in addition to the official documentation; basic setup guide, student guide and tutor guide. A number of short webcasts were also prepared to aid the users of the synchronous learning service.

Due to the global and critical role of the service, we also created a best practices guide to support the work of the tutors. This document included the maximum duration of each meeting, a proposal for creating educational material by recording a meeting, requirements for the room from which the meeting was conducted and guidance on the preparation of the presentation for the meeting. A special section was devoted on how to use an interactive board or a smart pen with the synchronous learning service. This allowed our educators to have a better interaction with their students by writing notes on the whiteboard and on presentation slides.

4.2 User satisfaction

"User satisfaction is possibly the most widely used measurement to evaluate the success of an information system" [20]. The importance of user satisfaction was identified in a number of research studies [21], [22]. After deploying a new service to eClass, we prepare a user satisfaction survey to evaluate whether our users have embraced it or not. The results of this survey give us a good indication for changes that we need to do, and areas we need to improve. In this work, we present in brief the design of a user satisfaction survey and the results of it for the synchronous learning service that was integrated with eClass.

4.2.1 Methodology

For conducting the survey, we prepared a questionnaire with eight questions chosen from the core requirements of the service. These requirements included sound quality, graphics and presentation, ability of the service to be used as a supplement of the face-to-face meetings, ease of use, etc. The questionnaire was sent to 66 people selected from all programmes of study. These people were members of the faculty and represented a sample of more than 25% of the faculty members.

4.2.2 Results

In this section, we present the results of the user satisfaction survey. For each question, we present the score given in scale of 1 to 5.

Table 1 – Question 1

Evaluate the synchronous learning service by ranking the quality of sound from 1 (not good) to 5 (very good)					
Rank	1	2	3	4	5
Number of users	0	2	6	29	29

Table 2 – Question 2

Evaluate the synchronous learning service by ranking the quality of graphics/whiteboard slides from 1 (not good) to 5 (very good)					
Rank	1	2	3	4	5
Number of users	0	1	6	32	27

Table 3 – Question 3

Evaluate the synchronous learning service by ranking the simplicity of use from 1(very difficult) to 5 (very easy)					
Rank	1	2	3	4	5
Number of users	0	0	9	23	34

Table 4 – Question 4

Evaluate the synchronous learning service by ranking the amount of problems/difficulties you faced while using it from 1 (many problems) to 5 (few problems)					
Rank	1	2	3	4	5
Number of users	10	25	13	15	3

Table 5 – Question 5

Evaluate the synchronous learning service by ranking the preparation procedure/setup needed before each meeting from 1 (difficult setup) to 5 (very easy setup)

Rank	1	2	3	4	5
Number of users	23	26	12	1	4

Table 6 – Question 6

Evaluate the synchronous learning service by ranking how easy it is to ask questions through the text chat functionality from 1 (very difficult) to 5 (very easy)					
Rank	1	2	3	4	5
Number of users	0	2	8	11	45

Table 7 – Question 7

Evaluate the synchronous learning service by ranking how easy it is to ask questions through the sound system using a microphone from 1 (very difficult) to 5 (very easy)					
Rank	1	2	3	4	5
Number of users	7	5	8	21	25

Table 8 – Question 8

Do you believe that the synchronous learning service can substitute completely the face-to-face meetings 1 (I totally disagree) to 5 (I totally agree)					
Rank	1	2	3	4	5
Number of users	11	16	14	10	15

4.2.3 Analysis

The results of the user satisfaction survey conducted at the Academic Year 2013-2014, verify that the service meets the expectations of its users. After careful examination of the answers users gave us, we deducted that our users had a difficult time setting up their device for using the service. This was an outcome of the recent update of JAVA, the technology that supports the service. This update required special settings from the client's part to allow the service to work properly. We have contacted the developers of the system to find a workaround for this.

The fact that users gave a high score on most questions verifies that they feel very comfortable with the service after years of experimentation and usage. A similar survey was conducted shortly after the service introduction (Academic Year 2011-2012), and the results were not so encouraging since there was a lot of resistance on using the service at that time. Repetition of the user satisfaction survey provides a good indication on the amount of time needed for users to adopt a service and become familiar with it.

5   CONCLUSIONS & FUTURE WORK

In this work, the authors presented a tested methodology for introducing a new service. This methodology was used in the introduction of many services in the University and the integration of them with eClass. Even though there are many already established research works on the New Service Delivery (NSD), we found that each organization can changed it according to its own needs

and special requirements it may have. We believe that this work is useful for other educational organizations that are in the process of deploying a new eLearning service and want to verify the steps needed to do so. The next steps for the OUC regarding the eClass eLearning platform, involve the introduction of more innovative services, including a lecture capture system that will enable tutors to create content for inclusion in their courses and a portfolio system that will give an added value and service to our students when they graduate from the OUC.

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