

A Management Framework for eLearning Information Systems Implementation

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Abstract

While many frameworks are available for eLearning and Information Systems, there is a fundamental lack of understanding of unifying these two elements for use in a university teaching sector. ELearning is trying to find a place where it can fit neatly without too much confusion, however, this has still yet to occur. To eliminate this confusion eLearning Information Systems (ELIS) require a framework that is easy to follow and can adapt to the specific needs of the higher educational sector. This preliminary research provides insights into the problems faced by academics with integrating technology into their classroom.

Overall, the results have indicated that using a framework that is widely accepted in industry and adapting it to use within a classroom have been encouraging. We suggest that with further trials and understanding of this industry framework, would help with the overall engagement of the student in the classroom would improve and consequently this would also have a productive effect on the academic delivering the subject.

Keywords— eLearning, Information Systems, Frameworks

Introduction

This paper will discuss the use of a framework predominately used in Information Technology (IT) in an organizational setting and adapting it to suit the implementation of an ELIS into a higher education classroom. In deriving what constitutes a good framework for such an integration to occur some fundamental observations must first be presented. This research is looking at three distinct components of an ELIS: the Service (design of the system), Delivery (transition of system) and Quality (perceived usefulness). Previous studies have reported on the three factors as one single, integrated element namely Service Delivery Quality (SDQ) while others have reported on service, delivery and quality as individual segments; however, there is no record of researchers putting all three segments together as an entire view of the Service, Delivery & Quality (S, D & Q) of an ELIS. This is an important oversight by previous researchers, as just looking at the individual components of S, D & Q will not truly satisfy the users in regards to the effectiveness of the ELIS. However, for true effectiveness of integration, consideration should be given to the continuous lifecycle approach that a framework can offer. One such framework is the Information Technology Infrastructure Library (ITIL) which has been used in organizations for over 20 years (Arraj 2013). ITIL has never been recorded as being adopted in an educational setting with regard to eLearning. To enable this integration to happen, different eLearning Information Systems (ELIS) were trialed in a university classroom. An ELIS should not be confused with a Learning Management System (LMS). The LMS is the used manage content that is delivered to students while in contrast, an ELIS is either the layout of the data within the LMS, or a standalone system accessed through the LMS.

Many higher education institutions use the ITIL framework within their IT departments for the enterprise-wide information systems they use. At our university the LMS is deployed under the ITIL framework to ensure that the lifecycle of the LMS is consistently being reviewed and change processes are being followed. Unfortunately the same cannot be said for an ELIS which does not follow a lifecycle approach to ensure continual improvement takes place.

Background

As educational technology and associated fields continue to evolve, conflicting findings have emerged regarding eLearning environments. In education today, a paradigm shift has occurred due to the critical challenges facing universities to enhance their teaching and learning through

innovation (Abdellatif et al 2011). Schools and universities have been quick to embed computers into the classroom – however; it has taken a long time to incorporate ELIS(s) and ensure their effective use.

The delivery of eLearning implies much more than a simple technical exercise in which some academics convert paper based material to electronic material and upload this on to the Learning Management System (LMS), offered at their particular institution (McPherson and Nunest 2008). In examining why this phenomenon has been occurring the researchers are trying to determine why an ELIS should be incorporated into the classroom and to identify an effective framework to enable a positive outcome of this integration (Gallagher & Sixsmith 2014a and 2014b). For successful ELIS implementation there needs to be a defined, rather than haphazard, approach which is based on a logical well-defined framework. This will allow all users achieve improved results from the introduction of Information Communication Technology (ICT) in the classroom.

Many theorists note that the introduction of ICT in the classroom will only benefit the learner (Churchill et al 2013). However, very few of the studies undertaken actually look into the IS being used. Theorists such as (Eom 2012) mention that an important goal of eLearning systems is to deliver guidelines that can produce equal or better outcomes than face-to-face learning systems, and that an understanding of systems quality, information quality and learning outcomes is required in the eLearning sphere. This is where the suggestion of an ELIS aligned to an effective framework comes into the fold, by looking at the Service, Delivery & Quality (S, D & Q) that is being offered by the chosen framework and that the ELIS enhances the learning outcomes of the student's interaction with it.

Maznevski (1996) notes that active involvement in learning increases what is remembered and how well it is utilized by the student and how it is applied to new situations. This is, in part, because students need to think about what they are doing. Context is important in learning, and situated learning is a key element in engaging students. Participating in activities that maximize learning allows students to grasp not only intended outcomes but also the underlying context on which the activity was based. Learning then becomes an experience and provides students with the knowledge to perform effectively (Gallagher & Sixsmith 2014a and 2014b).

Group work improves communication and understanding between individual students in a specific group and between student groups (and also between academics and students). Burns & Myhill (2004) suggest understanding evolves from “interactive, social situations, scaffold by, and in collaboration with, others” (p. 36). Tsui (2002) notes discussion creates a shared space for learning where students identify key aspects of a topic and the teacher obtains an appreciation of this learning experience and then attempts to broaden the common ground of understanding among all parties.

Enyedy & Goldberg (2004) note that pedagogy in general has shifted away from an exclusively individualistic approach to learning toward a perspective where learning is contextually driven through social interaction. When students enjoy a class they are more likely to achieve better outcomes, keep their attention levels high and therefore improve understanding of the content delivered. Engaging students in the learning process is particularly relevant when undertaking subjects which deliver content that is not considered appropriate to their field of study (Gallagher & Sixsmith 2014a and 2014b). To achieve this, the researcher have found a gap in the current bodies of work with regard to having an effective framework that can be followed, that looks at all the dimensions of the integration of the system.

Graduate Attributes

As many new teaching requirements and methods are being rolled out across universities it is an important time to introduce a common framework that can be adapted to suit different faculties. One of the main teaching requirements being rolled out across many Australian universities (for example University of Technology Sydney, Wollongong University, Royal Melbourne Institute of Technology, Griffith University) is that of Graduate Attributes (GAs). GAs are a set of skills that students need to acquire during their studies at university that will help them transfer skills easily across to industry on completion. To enable successful integration of the GAs into the curriculum, it was deemed necessary to adopt an industry standard framework to assist with the incorporation an

ELIS within a classroom environment.

Frameworks

Several frameworks have been explored for this research. These can be categorized as generic (for example adaptive or rigid) or specific (for example ITIL, and The Three Level Framework (TLF)). For the purposes of this research a framework is defined as the guidance needed for the user to implement an eLearning Information System (ELIS). Adaptive frameworks are deemed to be necessary when trying to integrate an ELIS into a Learning Management System. If it is too stringent, it doesn't allow for any changes that might be required. These frameworks have been reported on in previous work (see Gallagher & Sixsmith 2014a and 2014b).

An adaptive framework is able to accept the changing scenarios that may continually arise through the implementation process and so in essence it is flexible to its situation. With the new variables in pedagogy; flipped learning, blended learning and scenario based learning to name a few, an adaptive framework would seem the most logical solution to ensure that the integration of an ELIS into the classroom is successful. Theorists argue that using an adaptive framework is open to interpretation and could potentially create problems to both the adopter and the adoptee. However, if the person that is setting up the ELIS is the SME then using an adaptive framework would seem to be a logical choice, as it allows for the evolution of the IS to take place.

A rigid framework follows a defined path in which individual segments or phases follow each other and does not allow for phases to be improved, refined or revisited during the implementation process. On first inspection a rigid framework appears appropriate for ELIS implementation, however, having rigid segments hinders the development life cycle. Theoretically, if there is a problem it is not possible to step back and revise the design.

The ITIL framework was developed in the United Kingdom in the 1980s to help with the introduction of IT into organizations and since then it has become a fundamental framework used globally by IT departments. Developed as a best practice set of IT guidelines, procedures and processes ITIL is aimed at improving information systems and technology in organizations (Sixsmith & Glasby 2005). The ITIL Framework implements guidelines for key IT indicators in the areas of service strategy, service design, service transition, service operations and continual service improvement (Arraj 2013; Cartlidge et al 2007).

One of the key components of ITIL is the Service Strategy, any service provider must be grounded upon a fundamental acknowledgement that its customers do not buy products they buy the satisfaction of particular needs. Therefore, to be successful, the services provided must be perceived by the customer to deliver sufficient value in the form of outcomes that the customer wants to achieve (Cartlidge et al 2007). There are a number of benefits organizations can obtain from using ITIL. Arraj (2013: p5) identifies the following benefits: 1) alignment of IT with business needs; 2) negotiated and achievable service levels; 3) predictable and consistent IT processes; 4) service delivery efficiency; 5) measureable and improved IT services and processes; and 6) a common IT language within the organization.

As such, the S, D & Q of an ELIS falls neatly under the ITIL umbrella of and when utilized in this fashion as these guidelines provide the ability for IT services to add further value and create a whole package for eLearning delivery. While ITIL is predominantly a tool for corporate environments, its lifecycle approach is equally suited for an eLearning Information System, hence the direction this research is proposing.

Service, Delivery and Quality concept model

From the above discussion, it becomes apparent that ITIL can be adapted to various situations. As ITIL is usually utilized in commercial organizations, the issue being addressed is whether this is a suitable framework for ELIS integration into the classroom. Looking at the previous model of ITIL and adapting to suit the proposed model of S, D & Q:-

1. ITIL Service Strategy - The current research that is being undertaken is about implementing an ELIS into the classroom, previously no guidelines were used as the approach adopted was common practice among academics, which was to ensure that all documents were loaded online. Due to this haphazard approach, it was deemed that a more formal approach was required for successful integration of an ELIS. The ITIL lifecycle starts with *service strategy* – understanding who the customers are, the service offerings that are required to meet the customers’ needs, the IT capabilities and resources that are required to develop these offerings, and the requirements for executing them successfully (Arraj 2013). This step is outlined in the S, D & Q model as **Strategy**.

2. ITIL Service Design - How do you determine a students learning satisfaction, is it purely by collecting data from the LMS to see if a student is actually using the product effectively, if at all. Or, alternatively do you actually ask the student in several different formats what they thought of the ELIS and if it actually helped them learn. The ITIL *Service Design* ensures that the new and changed services are designed effectively to meet customer expectations (Arraj 2013). This step is outlined in the S, D & Q model as **Service**.

3. ITIL Service Transition – Previous research studies have examined the relationships between user satisfaction and individual effect (Eom 2012) and user satisfaction and learning outcomes. These studies consistently indicated that there is a positive relationship between user satisfaction and ELIS and ELIS effectiveness/learning outcomes (Eom 2012). The ITIL *service transition* phase of the lifecycle the design is built, tested and moved into production to enable the customer to achieve the desired value (Arraj 2013). This step is outlined in the S, D & Q model as **Delivery**

4. ITIL Service Operation – Self-efficacy relates to how a person motivates themselves and behaves and is defined broadly as an individual’s belief/judgment/perception of his or her abilities to use skills/artifacts including computers and information technologies (ELIS). Significant positive correlations have been found among the three eLearning variables (self-efficacy, eLearning satisfaction and perceived usefulness (Eom 2012). ITIL once transitioned, *Service operation* then delivers the service on an ongoing basis, overseeing the daily overall health of the service (Arraj 2013). This step is outlined in the S, D & Q model as **Quality**.

5. Continued Service Improvement - ELearning information systems allow students to work either with a group or autonomously. System use has been considered a factor that influences the systems success in the past decade (Eom 2012). System use for this research will be determined under the ITIL framework as *continual service improvement* (CSI). CSI offers a mechanism for the IT organization to measure and improve the service levels, the technology and the efficiency and effectiveness of the overall service (Arraj 2013). This aspect is important and is shown via the grey arrow in the S, D & Q model as being a **continuous service improvement, continual quality improvement, continual delivery improvement**.

The following concept model (see figure 1 below), which incorporates the S, D & Q components with aspects of the ITIL framework, has been constructed based on the findings and material collated to date for this research.



Figure 1: S, D & Q Concept Model

Research Methodology

This preliminary study uses an interpretive research approach as the intention of the research is to gain a deep understanding of the area under study. Denzin (2002) argues that interpretive research seeks to understand life experiences and as such 'gives greater substance and depth' to a study (p. 350). Case study research aligns closely with an interpretive research approach as it is an in-depth investigation into a specific area and allows for the exploration of significant features of the case to create credible interpretations from the everyday experiences of the participants (Crotty, 1998). As such, an interpretive case study has the ability to increase our understanding of a particular situation by providing an in depth understanding of the context under study (McGovern 2003; Morse & Richards 2002).

The background to this study comes from the researcher's experience with several different ELIS(s) which were integrated into the classroom over a of five year period (2011- 2015) in one subject offering at their university. While a detailed background story exists from this five year period (see Gallagher and Sixsmith 2014a and 2014b), this paper has a focus on the ELIS(s) used in 2013 through to 2015. To date, data has been collected via three mechanisms: -

1. a university run standard online university student feedback survey (SFS), comprising of six were scale questions and two free form answer questions;
2. an anonymous open-ended questionnaire (2013, 2014 & 2015) and
3. a directed in-class group presentations (2013 & 2015).

The data collected from these three mechanism forms the starting point for this case study research. Similar data will be collected during 2016. To complement this data, focus groups will be run with volunteers from the 2015 and 2016 student cohorts of the subject. A focus group aims to encourage participant discussion on these various issues introduced by a facilitator (Babbie 2002; McNeill & Chapman 2005). To ensure an in-depth coverage of the issues from a wide a range of participants several focus groups will be run for each student cohort.

Using thematic analysis, preliminary themes will be identified from the data and then consolidated to derive dominant themes with a view to extracting meaning and relevance to the research phenomena – the ELIS. By default, this process will also identify sub-themes and 'outlier' perspectives must also be analyzed to derive additional knowledge of the research phenomena (McGovern 2003; Morse & Richards 2002). It is envisaged that the data analysis will highlight areas where further improvements to the current ELIS operation can be made.

Preliminary Findings

As noted in Gallagher and Sixsmith (2014a and 2014b) to ELIS rollout commenced in 2011, and has now progressed through three iterations. For background to this paper, the first ELIS (2011-2012) was 'MyFinanceLab' (MFL), which was used for two years and required student's to access a system outside the university's LMS (Blackboard). MFL provided only limited improvement with student interaction, satisfaction and results. Many students stated that 'the IS being used is useless and of no benefit' (2011 student cohort). Another student stated 'It's a great concept, however, not easy to use' (2012, Student Cohort). This was common theme throughout the survey data collected and became driver for the use of a new and improved ELIS.

The following two years (2013-2014) saw an off-the-shelf system, a Flexible Learning Toolbox (FLT) implemented as the ELIS as a standalone system. The FLT, which could be adapted to suit the requirements of the users, had a user- friendly interface, however, students had a mixed reaction to this ELIS. Comments from the 2013 student cohort ranged from - '[w]hy use such a tool like the toolbox – waste of space if you ask me' to "[t]his is great easy to use good concept ability to go back whenever we want is great' (Student Cohort 2013). As such there was a need to improve this ELIS for the following year which was achieved through integrating the ELIS into the LMS. However, with the ELIS not being a university supported IS problems surface as only some components of the ELIS could be rolled out within the LMS.

Following these changes 2014 saw some improved success with the ELIS. It had a 'cleaner' feel to

the way it operated as it was amended and implemented using the ITIL framework. This gave the students a much better learning experience. This was reflected in the survey feedback – a 2014 student commented that it was ‘a great concept with having access to information in the LMS and access to an external IS – helped with our study’. However, for some students it was hard to navigate around the two different systems even though thorough instructions were provided the system was not an intuitive ELIS. One 2014 student commented ‘[p]lease fix the toolbox, the rest of the subject is excellent’ and ‘[t]he toolbox needs to be scrapped, it is useless’.

In 2015 a revised perspective was taken on the ELIS as it was decided to utilize the Blackboard LMS at its optimal level. Using the information from the previous ELIS (the FLT) and the ITIL framework the learning modules were created in the LMS. In undertaking this revised perspective was given to the S, D & Q of the information being presented which took many months of careful planning to ensure an effective alignment to the S, D & Q concept model. An evaluation was completed before the system roll-out and the only downside to surface was the sequential nature to the learning process. This sequential learning seemed like an obvious choice as on a weekly basis the information and activities on subsequent topics build upon information and activities from previous topics. This was the main student complaint in relation to the current of the ELIS, - that they were forced to look at all information on a weekly basis. However, this complaint could be deemed null and void as the sequential nature of the ELIS was put in place to ensure successful learning outcomes are achieved through a progressive build-up of relevant information and practical activities. From interpretation of the 2015 survey data it is believed that student complaints were more aligned with actual workload rather than the ‘forced’ sequential learning and this will be further investigated in future focus groups. Positive comments from the 2015 cohort included [v]ideos came with weekly content to help understand financial principles etc”, “[t]he subject materials were well organized”, and ‘[w]e were given the freedom to collaborate and work with almost everyone in the tutorial. It is a distinct quality of this subject, which ... made the learning experience enthusiastic”. Conversely negative 2015 student cohort comments included the “[l]ack of connection between the tutorials and the lecture materials” and “the content of this subject was so poorly handled [and] there were online modules that were supposed to be done prior to the lesson, but then were not gone through in the lesson.”

Conclusion

While implementation and evaluation frameworks exist for both eLearning and information systems, there is limited understanding of unifying these elements for use in the university sector. To overcome this, an adaptable and easy to follow framework is required to guide an ELIS implementation. The research provides an insight into the problems faced by academics integrating technology into their classroom and how through the use of the ITIL framework an ELIS implementation has led to a more engaged student population in the classroom and as such has improved student learning outcomes.

Overall, the preliminary results from the initial ELIS implementation have been encouraging, but further work is required. It is envisaged that an additional subject will be included in the study commencing from the second teaching semester of 2015 and that data from both subjects will also be collected in 2016 using the mechanism outlined in the research methodology section of this paper.

Several avenues of future research are envisaged at this point in time. Firstly, undertake focus groups on the 2015 and 2016 student cohorts (as mentioned in the Research Methodology section above) in order to delve deeper into the preliminary findings presented in this paper. Secondly, expand the ELIS research through an investigation at an individual student level on student learning perspective in regards to ELIS usage. Finally, undertake a focused study on the Service Delivery and Quality of the ELIS ascertain which of these components warrant further investigation under the ITIL framework with the aim of establishing whether ITIL is an appropriate approach to oversee the incorporation of an ELIS in the classroom.

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