Lessons Learned from Introducing a Learning Management System to Support Face to Face and Blended Learning Courses in an MBA Programme

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ABSTRACT

Although there are a number of benefits and recommendations that are common to most educational institutions that adopt a learning management system (LMS), there are also some positives and negatives peculiar to the particular institution under consideration. This study looks at the implementation of a LMS at a leading business school in the Caribbean. This school was chosen because there were some characteristics in terms of the governance structure and organization of the school that brings out some peculiarities that may be found in other business schools. In addition to identifying these peculiarities and the issues that they raise, some recommendations are made for how these can be addressed to ensure that the benefits of the LMS can be maximized. From these experiences a methodology will be posited which can be used by other educational institutions considering adopting a LMS.

Keywords

Blended Learning, Learning Management System, MBA.

INTRODUCTION

Learning Management Systems (LMS) have been defined as web-based systems that include both synchronous and asynchronous tools that are used to support both learning and administrative functions (Black, Beck, Dawson, Jinks and DiPietro, 2007). These systems have become common place in higher education (Al-Busaidi, 2012; Beer, Clark and Jones, 2010; Coates, James and Baldwin, 2005; Cohen and Nachmias, 2006). The LMS is commonly used to support blended learning, a combination of face to face and distance delivery systems. Some of the benefits of using LMS for blended learning have been discussed in the literature, these include improved efficiency, improved conveniences for students and more diverse learning experiences (Coates et al., 2005; Harrington, 2004).

This paper was motivated by the experiences gained from adopting a LMS for blended learning in the MBA programme at one of the leading business schools in the Caribbean.

During the adoption of the LMS a number of benefits were realized. This included unanticipated benefits; benefits not typically reported in the literature. The process also brought to light additional factors that institutions should consider when adopting an LMS. A number of institutions have adopted these systems or are considering adopting these systems but may not understand their full potential and therefore the benefits of the system cannot be maximized. Additionally, many institutions may not understand the process or important factors to consider when adopting these systems.

This research uses a case study approach to add to this body of research by identifying some of the *unexpected* benefits that were gained from the adoption of a LMS. It then provides some recommendations and a process that can be used to ensure that the full benefits of the LMS with the blended approach be realized. This can then be used by other educational institutions that are considering adopting a blended learning approach with the support of a LMS as well as by researchers as input to the development of a mature learning management system adoption approach.

In the next section a review of the literature which provided a framework for this research is presented. This is followed by a description of the process used for the adoption of the LMS and its facilitation of a blended learning approach. A discussion of the unexpected benefits and problems that were experienced will ensue and from this a method for LMS adoption is proposed. Finally, concluding remarks and directions for future research are presented.

LITERATURE REVIEW

Learning Management Systems are thought to be one of the most used technologies in higher education (Coates et al., 2005; West, Waddoups and Graham, 2007), some say as much as 95% of colleges and universities use these systems (Pollack, 2003). In previous years the investment in these technologies was significant (Pollack, 2003), however, there are alternatives with the availability of open sources solutions (Black et al., 2007). Although these technologies are widely used and are used to support the core business of universities - teaching and learning, it is felt that the research into the implications of these systems is still in its early stages (Coates et al., 2005). These implications are influenced by the adoption approach taken and therefore there is need to review the adoption process. Instructors who teach face to face can use the LMS to deliver additional or supplemental course materials to students, the aim of which is to enhance learning (Vovides, Sanchez-Alonso, Mitropoulou and Nickmans, 2007). When this is done the teaching method is often referred to as blended learning.

Although the term blended learning is used with frequency, there is still a diversity of opinions as to how blended learning is defined and therefore implemented (Akkoyunlu and Soylu, 2008; Osguthorpe and Graham, 2003). Osguthorpe et al. (2003) define it as the combination of face to face and distance delivery systems in an attempt to complement the strengths and weaknesses of one with the other. They found that blended learning environments are diverse and emphasized the need to compare various approaches to blended learning in order to understand how to maximize their benefits while minimizing the potential barriers.

There have been studies that examine the effect the adoption of blended learning has had on course delivery (Al-Busaidi, 2012; Cohen et al., 2006; Perrin, Rusnak, Zha, Lewis and Srinivasa, 2009; Vernadakis, Antoniou, Giannousi, Zetou and Kioumourtzoglou, 2011). Vernadakis et al. (2011) studied the effect of a hybrid (blended) learning approach in the delivery of a first year computer science course. They found that the hybrid approach was able to provide a slightly more efficient learning environment than the traditional lecturer instruction. More specifically, they found that the blended approach leads to learner-centered, active and constructive learning. Cohen et al. (2006) identify an improvement in (i) instructional quality (ii) affective aspects (iii) the efficiency of the teaching and learning process and (iv) knowledge management as some of the benefits provided by LMS. Perrin et al. (2009) consider the issue of consistency of delivery across multiple course sections. They found that blended learning could be used to ensure consistency of learning, teaching, curriculum and materials. Al-Bussaidi (2012) provided a comprehensive examination of the critical factors that influence the success of LMS in blended learning and its continuous use – from the learner's perspective.

A number of researchers have identified some of the important factors that should be considered when adopting blended learning using a LMS (Garrison and Kanuka, 2004; Mitchell and Honore, 2007; Ooms, Burke, Linsey and Heaton-Shrestha, 2008). Mitchell et al. (2007) identify some factors that should be considered when adopting blended learning based on experiences from teaching an EMBA course. They highlight the need for a balance in terms of blended learning and recommend that no more than two modules, of a 12-module course, should be delivered online. They also point out that care must be taken to ensure that the adoption is not seen as a cost cutting initiative and stress that the human resources needed to support blended learning are critical for success. They emphasize that e-learning is not just about the adoption of some technology but to be successful there is the need for an e-learning strategy and culture.

Garrison et al. (2004) stress the need for a redesigning and rethinking of the teaching and learning relationship when adopting blended learning. It cannot be seen as simply distributing the same content using a different medium. Thus, it is important to recognize that the process will require experts who understand the available mediums and how to carry out this redesign. Garrison et al. (2004) also point to the need for the development of policies and plans (strategic and operational) for blended learning initiatives.

Ooms et al. (2008) study the importance of the role of what they have termed the e-developer to support academic staff when adopting blended learning. They role involved engaging in a number of activities that included staff development in both the pedagogic and technical aspects of the LMS, the pedagogical support and advice to academic staff and technical support. These e-developers were required to have regular meetings with individual academics to convert modules that were traditionally delivered face to face into blended learning modules.

This paper uses a case study to address the identified need for more studies that focus on the approaches to blended learning. It describes the experiences of a leading business school in the Caribbean that took the strategic decision to adopt the blended learning approach and highlights the lessons that were learned from this. The study will also focus on the experiences specific to the adoption of one of the open source solutions (i.e. Moodle) for learning management systems. The findings in the existing literature as well as this study are used to formulate an effective method for moving to blended learning. This can be used as a basis for other institutions considering the blended learning approach.

CASE STUDY

Overview of Case

The case study focuses on the implementation of an LMS at a Caribbean business school. The goals of implementing the learning management system were to improve operational efficiency and to provide the school with a number of opportunities to strengthen its brand, as a leader in the graduate management education space, by improving and broadening the learning experiences of its students. The specific case proved interesting due to the size and structure of the school. Firstly, the corporate governance structure of the school imposes two priorities that are equally important. On the one hand there is quality assurance in its academic programmes for which the business school must adhere to the wider universities statues and ordinances and on the other hand there is a board of directors that oversees the commercial and financial proprietary and viability of the school. The school operates under the profit motive as it is a self-financed school, thus, there is a real need to justify the investment in a LMS. Secondly, there is a high reliance of adjunct or part-time faculty and therefore quality assurance is a critical concern of the school. Thirdly, there are support staff members (programme coordinators) who not only ensure the administration of the programmes but act as liaisons between lecturers and students and therefore play a key role in the implementation and adoption of the learning management system.

A decision was made to adopt a blended learning approach to the delivery of courses in the MBA programme, the largest program offered at the school offer. The MBA is currently offered either full time or part time and there are a number of part time offerings and therefore there are a number of deliveries of a given course within an academic year. These courses are primarily delivered by a pool of adjunct or part-time lecturers. Therefore, a given course can be delivered multiple times by different instructors within an academic year. This scenario presents a challenge which makes ensuring the quality and consistency of course delivery an essential consideration (Perrin et al., 2009). One of the techniques the school uses to ensure the consistency and the quality of course delivery is the assignment of a full time faculty member, known as a cluster coordinator, to oversee the adjunct instructors delivering courses within a particular discipline within the MBA programme.

Approach to Adoption

Given the lack of available methodologies for LMS adoption, the approach to adoption was guided by the existing literature on the implementation of LMS and other information systems, project management and real world experiences of the researchers. One of the school's goals was to provide a web presence for all the courses offered in the MBA programme and to redesign core courses (i.e. those in the core of the programme) to optimize the benefits that the LMS can provide. However, the school has built a reputation on face-to-face delivery, therefore, a strategic decision was made to limit the number of face-to-face sessions that were replaced with the online delivery of content for a given course. A maximum of 40 per cent was set for the number of face-to-face sessions that could be replaced by online modules. This is consistent with the findings of Mitchell et al. (2007). This move to blended learning using a LMS was in line with the strategic plan of the university to which the business school belongs. The university in their strategic plan for 2007-2012 identified Teaching and Learning Effectiveness as one of their objectives. One of their priorities was to focus on technology driven improvements to teaching and learning enhancements, including increased flexibility in course delivery.

In adopting this LMS all the courses delivered in the MBA programme were classified as Web-supported or Web-enhanced (hybrid/blended) and the content for all courses were uploaded to the LMS. Many of the courses that start out as web-supported are to be converted to web-enhanced over time. The primary differences between web-supported and web-enhanced courses are the number of face-to-face contact hours student will have with instructors, the degree to which the LMS is used to deliver content and resources and the CMS's utility in course administration.

To be successful, the conversion or adoption of a traditional face-to-face course to a web-enhanced course requires careful pedagogical redesign (Garrison et al., 2004). One widely used model requires instructors to conduct the conversion of their face-to-face courses. In that model, instructional design support is made available to instructors on request. This popular model requires instructors to spend a significant amount of time to redesign and upload their courses, prior to the scheduled course delivery. Given that instructors are not compensated for the additional time required to redesign their courses, they may not have the required competencies with respect to eLearning and pedagogy, and have varying degrees in technology skill sets; the resulting web-enhanced or web-supported courses, within an institution, are often found to vary significantly in quality (Al-Busaidi, 2012).

The school realized that this widely used approach would not be suitable because of the school's reliance on adjunct faculty who are unlikely to be willing to invest the time required. To address this issue of relying on the instructor to ensure the quality and consistency of the web based course delivery, an instructional designer (ID) was assigned to perform the initial conversion of the courses. This is similar to the role of the e-developer proposed by Ooms et al. (2008). The ID collaborated

with the instructor throughout the conversion process. For each course, both the ID and the instructor received technical support from the information systems unit and administrative support from Program Coordinators. Program Coordinators are full time employees that provide administrative support for instructors and students.

During the adoption of the LMS and the implementation of a blended learning approach, a number of important issues surfaced and were subsequently addressed. The following provides an overview of the issues.

Change Management and Training

To ensure that students, instructors and support staff (e.g. programme coordinators, IT support) were aware of the planned changes, a short change management program was implemented. To raise awareness among all full time and adjunct faculty, meetings were held to present and discuss how the implementation of a LMS aligned with the strategic plan of the school as whole. During new student orientation, students were informed about the function of the LMS and were provided with an explanation of the blended learning approach for the delivery of core courses and the benefits of the approach. The programme coordinators were told how the use of the LMS would impact their roles and it was emphasized how the system would be used to make completion of their current tasks more efficient.

Technical training on the use of the LMS was provided for all students, instructors, cluster coordinators, program coordinators and help desk personnel. The training program included the development of online tutorials, job performance aids, reference sheets, the delivery of workshops and one-on-one consultation as requested.

Technology

The costs of the various approaches for adopting a LMS should always be considered. On reviewing a number of solutions, two primary solutions were selected for further analysis. One solution would require the business school to pay for the use of an existing LMS implemented at its parent university. The second solution would require the business school to implement and manage a LMS independently. The second approach was taken, the details of which are described below:

i. Learning Management System / Delivery Platform - the Moodle Open Source LMS was the preferred choice for the business school's eLearning environment. Moodle is one of the most popular LMS in use across the world (Al-Ajlan and Zedan, 2008) with thousands of Moodle sites in hundreds of countries and is a "mature" Open Source product that provides an extensive range of learning activities and resources required to enable the school's planned course delivery modes (Lakhan and Jhunjhunwala, 2008; Machado and Tao, 2007). The Open Source nature of the product provided opportunities for a customizable low cost solution.

ii. Technology Deployment Model - the school made the decision to use Cloud-Computing as the deployment model. The benefits of Cloud Computing are primarily due to the economies of scale derived from shared large-scale computing and storage infrastructure managed by popular service providers (e.g. Amazon) (Armbrust, Fox, Griffith, Joseph, Katz, Konwinski, Lee, Patterson, Rabkin, Stoica and Zaharia, 2010). These benefits can be economic; (i) there is no need to invest in capital-intensive Data Center equipment (ii) the utility computing model (Pay As-You-Go) requires payment based only on what is used (iii) facilitates virtualization which allows many servers to be deployed on a single physical infrastructure, this results in optimized sharing in the use of hardware resources.

FINDINGS

Benefits

Although the use of the LMS at the school is still fairly new (approximately three years) a number of potential benefits have already been realized. The extent to which the stakeholders would benefit from the adoption was not anticipated as they are not widely discussed in the literature. The following highlights the main benefits identified:

1. Improvements in the efficiency of managing the academic profiles of students – during the delivery of a course the programme coordinators collect the coursework grades from the instructor. They record this in a spreadsheet and at the end of the course they combine it with the exam grade to determine the overall grades. These grades then have to be entered in the Student Administrative System. The coordinators have expressed that this task of entering and disseminating grades are being done more efficiently through the grade book of the LMS. The school has a significant part time enrollment and it was common practice for students to contact the coordinators to enquire about their grades. With the implementation of the LMS, students are able to access this information directly which has reduced the time coordinators have to spend on this task. This improvement in efficiency is not spoken about extensively in literature.

2. Decrease in time and cost spent on photocopying – previously the course materials were photocopied by the programme coordinators and given to the students. They are now being posted on the LMS which has led to a significant reduction in the cost of photocopying, this is reflected by a reduction in the budget allocation for printing expenses. The school also encourages and supports the instructor maintaining their own course container. The time that the programme coordinators used to spend on managing the photocopying can be spent on more meaningful tasks. The extent of these savings experienced in this case is not discussed as a significant benefit.

3. Increased job satisfaction – these improvements in efficiency in managing academic profiles and distribution of course materials has redefined the role of the programme coordinators. They spend less time on what they considered to be menial tasks and allowed them to devote this time to more meaningful functions. It also allowed the school to train and use some of these persons for other roles that the school had identified as important but did not have the resources to support (e.g. Student and Alumni Services Officer, Academic Counselor, Coordinator of LMS). Most of the programme coordinators have post graduate degrees so this redefining of roles has improved job satisfaction. Literature often focuses on the satisfaction of the lecturers and not how it affects the support staff.

4. Quality assurance across deliveries – the cluster coordinators expressed that the LMS has assisted in their task of ensuring the consistency across multiple deliveries of the same course. Firstly, although a container was created for each course delivery, the template was copied across containers so that they have the same look and feel, but it allows the lecturer the freedom to personalize it to some extent. The LMS makes it easier for the cluster coordinator to monitor the various deliveries by adding them to each course container that allows them to access the material the lecturers are distributing. Therefore, the cluster coordinator task of ensuring this consistency across course deliveries has been significantly reduced.

5. Increase in instructional activities catering to a larger range of learning styles – a questionnaire was administered and informal discussions were held with the students that had experienced the blended courses. The students all expressed that they were satisfied with how materials are distributed and how communication is done through the LMS. Where there was the greatest difference of opinions were for the courses which utilized a blended approach to learning. While the majority expressed that the materials that were converted to online were done effectively, there was some differences as to their preferences of face to face versus online delivery. This seems to support the notion that that the different learning styles view the options differently. Students agreed that the blended learning approach made it more likely that a student would be able to find an instructional activity that suited his/her learning style.

6. Increased student satisfaction – previously students had to travel to the campus to retrieve grades posted on a bulletin board and to receive copies of lecture material. With the LMS, students are able to access their grades remotely and securely. They are also able to retrieve learning materials posted prior to classes that allow them to better prepare for face-to-face classes. The LMS also serves as an archive of resources, providing students with access to material previously posted by the instructor.

7. Increased access to and awareness of instructional material - one very interesting observation was that a number of instructors, in working with the ID, expressed that they did not realize the extent to which content was available online and how it could be used as a teaching resource. Even those instructors that had expressed some reservation to the move to blended learning did state this as an important, unexpected benefit.

8. Low cost deployment approach – the model of combining the cloud infrastructure with the open source LMS can prove to be a viable option for schools that are looking for a low cost alternative to blended learning.

9. Improvement in the overall quality of the course – even with the ID there is some amount of investment of time on the part of the instructor. Participation in the course conversion process requires the lecturer to review the course. In many cases this has led to an improvement and realignment of course materials and course activities and an overall improvement in course quality. This was identified through discussions with the participant lecturers and by comparing the newly developed course to prior offerings of the course.

Critical Success Factors

In assessing what lead to the success of the adoption of the LMS, a number of factors were identified as being critical. Other universities should consider these factors to ensure they maximize their investments in the LMS:

1. The role of the Instructional Designer (ID) – the ID was engaged to work with the lecturers to convert some face-to-face modules to asynchronous online modules. This proved to be a very important decision for the success of the project as in many cases the effort and expertise required to do this is understated. The task of conversion is often left to the sole

effort of the lecturer. This is an issue that any school considering moving to a course management system should consider carefully. Many of the instructors stated that they did not understand the type of learning objects and exercises that could be created and delivered using a LMS. They felt that it would not have been possible to conceptualize or create the online content for their courses without the support and guidance of the ID. The ID, having knowledge of both technology and pedagogy, was able to assist the instructors to bridge the gaps that occurred when moving from face to face to asynchronous modules online.

2. Sensitizing stakeholders– information sessions with the various groups were conducted. For students, this cost was minimal as it was included in the existing orientation session. For academics, specifically adjunct, meetings were held to ensure there was a clear understanding of how the LMS aligned with the overall strategy of the school and the university of which it is a part. The meetings provided opportunities to discuss the expectations from lecturers, students and programme coordinators. The programme coordinators were also exposed to how it could be used to improve the efficiency of their tasks.

    These sensitization sessions proved to be extremely important especially given the length of tenure of a number of lecturers and administrators. These lecturers and administrators were aware of the good reputation held by the school prior to the use of an LMS. As a result many questioned the need for change. For example, the programme coordinators expressed concern that no longer providing students with photocopied materials could be seen as a disservice to the students. However, once those students who were accustomed to the old process had graduated and the new process, using the LMS, became the accepted norm and the coordinators began to realize the benefits the system would provide there was general acceptance. Change management proved to be extremely important to success.

3. Mandating the change – it is important the school mandates this change. If change were left to the individual instructors, this would have resulted in the partial adoption and underutilization of the LMS. Instructors who do not fully understand the benefits of the LMS may have chosen to continue course delivery as they have in the past. This has happened at other departments within the parent university. This inconsistency would be realized by the students and could result in students demanding what they felt was best suited for them (e.g. the photocopied materials etc.), without understanding the larger strategic plans of the school.

4. Training students, staff and administration – a budget was prepared which included the cost of training the academic staff and programme coordinators. Additionally, one of the programme coordinators was trained to train any new lecturers or coordinators and to provide ongoing support for both academics and coordinators, thus, establishing a new role of a Learning Management Systems (LMS) Coordinator. This role proved to be vital as the liaison between the technical team, the academics and the coordinators.

5. Identifying a Champion – although there was some resistance from the instructors, once the process started and the benefits of the approach started to be realized those persons became champions for other instructors. In our case it turned out that one of the senior instructors (and cluster coordinator) that did not have a lot of experience in technology was one of the first persons to meet with the ID and complete the course conversion process. Impressed with the capabilities of the LMS and the blended approach to course delivery, this instructor quickly became a champion for the process. Once the cluster coordinators were onboard it was easy for them to mentor other adjunct instructors, under their supervision, as they adopted the LMS. This was critical to the success of the project.

    The programme coordinator who was assigned the LMS coordinator role proved to be champion for his peers. The other coordinators were comfortable with him and he devoted a considerable amount of time to addressing their concerns.

6. Infrastructure – the decision to personalize Moodle and use Cloud Computing was made after an alternative option of paying a per student per course fee for use of an existing LMS, used at the parent university, proved cost prohibitive. This decision required the school to obtain technical expertise to provide support for the system. The final solution with the cost of additional technical support required, still provided a more cost effective solution than the other approaches considered. It also allowed the school to have more control over the administration and maintenance of the LMS.

ADOPTION METHODOLOGY

Coming out of the findings of existing literature and this case study, the following methodology for adopting an LMS and blended learning is proposed.

1. Develop the overall strategic plan for the project – in this case the strategic plan was developed and a concise budget was formulated. This plan aligned with the strategic plan of the business school and the university as a whole. Advice was sought to ensure that all costs are considered in the budget for the project (i.e. training, change management, etc.)

2. Consider the various technology deployment models that can be used – there are various choices that can be made here so ensure that all are considered (e.g. open source, cloud).

3. Clearly communicate plan to all stakeholders - this communication should come from the highest level (in this case the Executive Director of the business school) to ensure that all persons are clear about the commitment of the school to the process.

4. Define the roles and tasks specific to blended learning – in this case the role of the ID and LMS Coordinator were new roles.

5. Identify the actors for the newly defined roles – carefully choose the persons that will play the roles of ID and LMS Coordinator.

6. Identify the champions for the project – ensure that these are people that can influence others.

7. Monitor the adoption process carefully – at the beginning there may be unexpected issues that arise (e.g. resistance from students, instructors; technical issues). Ensure that these are managed well as this will be instrumental to stakeholders acceptance.

CONCLUSION

There are a number of well-documented benefits that result from the adoption of a LMS and a blended learning approach to learning. However, this research has identified other benefits, which are not well documented, but have been found to lead to significant improvements in efficiency. Additionally, there are a number of factors that have been identified as critical to the success of the adoption process. If special attention is paid to these issues then it is likely that an educational institution will have lower levels of resistance to the adoption process.

This synthesis of information formulates a practical methodology that will be useful to other educational institutions considering the implementation of a blended approach to learning and those considering the implementation of a LMS. This methodology provides insight on accomplishing the smooth adoption of an LMS allowing for the maximization of the investment required to implement a LMS. It is expected that other researchers will refine and extend this methodology as new lessons are learned.

In this case an open source LMS was chosen and therefore the factors and benefits identified may not necessarily apply to vendor-supplied LMS. Further research in this area is needed. Additionally, the focus of this paper was on the benefits of the adoption and therefore much emphasis was not placed on the obstacles, this will be discussed in future work.

REFERENCES

1. Akkoyunlu, B. and Soylu, M. Y. (2008) A Study of Student's Perceptions in a Blended Learning Environment Based on Different Learning Styles, *Educational Technology & Society*, 11, 1, 183-193.

2. Al-Ajlan, A. and Zedan, H. (2008) Why Moodle, *Proceedings of the 12th IEEE International Workshop on Future Trends of Distributed Computing Systems*, Kunming, China, 58-64.

3. Al-Busaidi, K. A. (2012) Learners' Perspective on Critical Factors to LMS Success in Blended Learning: An Empirical Investigation, *Communications of the Association for Information Systems*, 30, 2, 11-34.

4. Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., Lee, G., Patterson, D., Rabkin, A., Stoica, I. and Zaharia, M. (2010) A View of Cloud Computing, *Communications of the ACM*, 53, 4, 50-58.

5. Beer, C., Clark, K. and Jones, D. (2010) Indicators of Engagement, *Proceedings of the ASCILITE Conference*, Sydney, 75-86.

6. Black, E. W., Beck, D., Dawson, K., Jinks, S. and DiPietro, M. (2007) The Other Side of the LMS: Considering Implementation and Use in the Adoption of an LMS in Online and Blended Learning Environments, *TechTrends*, 51, 2, 35-39.

7. Coates, H., James, R. and Baldwin, G. (2005) A Critical Examination of The Effects of Learning Management Systems on University Teaching and Learning, *Tertiary Education and Management*, 11, 19-36.

8. Cohen, A. and Nachmias, R. (2006) A Quantitative Cost Effectiveness Model for Web-Supported Academic Instruction, *Internet and Higher Education*, 9, 81-90.

9. Garrison, R. and Kanuka, H. (2004) Blended Learning: Uncovering its Transformative Potential in Higher Education, *Internet and Higher Education*, 7, 95-105.

10. Harrington, C. F., Gordon, S. A., & Schibik, T. J. (2004) Course Management System Utilization and Implications for Practice: A National Survey of Department Chairpersons, *Online Journal of Distance Learning Administration*, 7, 4.

11. Lakhan, S. and Jhunjhunwala, K. (2008) Open Source Software in Education, *EDUCAUSE Quarterly*, 31, 2, 32-40.

12. Machado, M. and Tao, E. (2007) Blackboard vs. Moodle: Comparing User Experience of Learning Management Systems, *Proceedings of the 37th ASEE/IEEE Frontiers in Education Conference*, October 10-13, Milwaukee, WI, S4J-7-S4J-12.

13. Mitchell, A. and Honore, S. (2007) Criteria for Successful Blended Learning, *Industrial and Commercial Training*, 39, 3, 143-149.

14. Ooms, A., Burke, L., Linsey, T. and Heaton-Shrestha (2008) Introducing e-developers to Support a University's Blended Learning Developments, *Association for Learning Technology (ALT-J) Journal*, 16, 2, 111-122.

15. Osguthorpe, R. T. and Graham, C. R. (2003) Blended Learning Environments - Definitions and Directions, *The Quarterly Review of Distance Education*, 4, 1, 227-233.

16. Perrin, K., Rusnak, L., Zha, S., Lewis, D. and Srinivasa, S. (2009) Using Blended Learning to Ensure Consistency and Quality in Multiple Course Sections, *Journal of the Research Center for Educational Technology (RCET)*, 5, 1, 42-48.

17. Pollack, T. A. (2003) Using a Course Management System to Improve Instruction, *Proceedings of the ASCUE Conference*, June 8-12, Myrtle Beach, South Carolina, 225-230.

18. Vernadakis, N., Antoniou, P., Giannousi, M., Zetou, E. and Kioumourtzoglou, E. (2011) Comparing Hybrid Learning with Traditional Approaches on Learning the Microsoft Office Power Point 2003 Program in Tertiary Education, *Computers & Education*, 56, 1, 188-199.

19. Vovides, Y., Sanchez-Alonso, S., Mitropoulou, V. and Nickmans, G. (2007) The Use of e-learning Course Management Systems to Support Learning Strategies and to Improve Self-regulated Learning, *Educational Research Review*, 2, 64-74.

20. West, R. E., Waddoups, G. and Graham, C. R. (2007) Understanding the Experiences of Instructors as They Adopt a Course Management System, *Education Tech Research Dev*, 55, 1, 1-26.