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ATTITUDES AMONGST LECTURERS IN ENGINEERING EDUCATION: THE USE OF LEARNING MANAGEMENT SYSTEMS IN DEVELOPING COUNTRIES

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RESUMEN

Un grupo de profesores de educación de las ingenierías que tomaron parte en un curso introductorio en Cuba sobre el uso de Sistemas de Gestión para el Aprendizaje (LMS, con sus siglas en inglés) opinaron sobre el futuro del uso del LMS. Las respuestas sugieren que los profesores, aún con poca experiencia manejando LMS, creyeron que en el futuro podrían beneficiarse con el uso de un LMS y que están preparados para usar los programas tan pronto como hayan sido adecuadamente entrenados y tengan suficiente acceso a computadoras e internet. Se recalca que la posibilidad de mejorar la eficiencia, calidad y acceso a la educación mediante el uso de LMS depende de que el sistema sea completamente implementado. En base a lo encontrado en esta investigación los autores recomiendan que las universidades de países en vías de desarrollo tomen acciones inmediatas para dar a sus profesores el entrenamiento en el manejo de LMS y los incentiven para usar extensivamente el LMS tan pronto como haya suficiente acceso a computadoras.

PALABRAS CLAVES: Tecnologías de la información y la comunicación, e-learning, Sistemas de Gestión para el Aprendizaje, educación superior, países en vías de desarrollo.

ABSTRACT

In this investigation a group of lecturers in engineering education in Cuba that took part in an introduction course about the use of Learning Management Systems (LMS) gave their opinions about the future use of LMS. The answers show that the lecturers, even though they had little experience in handling a LMS, believed that they could benefit from the use of a LMS in the future and that they are prepared to use the programs as soon as they get proper training and the access to computers and internet is sufficient. It is pointed out that the possibility to improve efficiency, quality and availability of education by the use of a LMS depends on the system being fully implemented. In view of these findings the authors recommend that universities in developing countries take immediate steps to give lecturers training in the handling of LMS and encourage them to prepare for an extensive use of LMS as soon as the access to computers is sufficient.

KEY WORDS: information and communication technology, e-learning, Learning Management systems, higher learning institutions, developing countries.



1. INTRODUCTION

Over the past 15 years a number of LMS have been developed and marketed, there are many systems available with similar tools, such as shared documents, discussion board, assessments, grade book and chat rooms (Britain & Liber, 1999; Seeger & Åström, 2005; Sigrén & Holmqvist, 2005). Today a LMS can be seen as a indispensable tool for most institutions in higher education. (Grob et al., 2004) Apart from the proprietary LMS there are also many open source LMS available with similar functions. (Paulsen, 2003; Uzunboylu et al., 2006) There seems to be little or no difference between the most widespread open source LMS and the leading proprietary ones in functionality and reliability (Uzunboylu et al., 2006) and when all costs (licenses, service, support etc) are included it will probably be much cheaper to use free open source programs than to buy any commercially available product. It may seem surprising that educational institutions pay for proprietary systems when there are good cheaper alternatives. The explanation is probably that a decision to use free software instead of going through a conventional procurement process expose administrators to the risk of being blamed for any problems with the system. (Grob et al., 2004; Wheeler, 2007) However, that is outside the scope of this investigation, but it is important for the possible application of LMS in developing countries that there are low-cost alternatives. It has been demonstrated that most lecturers in higher education in developed countries are optimistic about the potential benefits of using a LMS, (Bongalos et al., 2006; Ramon Garrote & Pettersson, 2007; Wan Ng et al., 2003), but also, that even if they have access to a LMS and their students have ample access to computers and internet many teachers still only use the parts or functions that replace older techniques for reproducing and distributing documents (Bongalos et al., 2006; Dutton et al., 2004; Ramón Garrote, 2006; Ramon Garrote & Pettersson, 2007). How the use of LMS have influenced the higher education in developed countries have been investigated (Coates, 2005; Paulsen, 2003) and some conclusions have been reached. As long as a LMS is only used to distribute documents from teacher to students it probably won't make any significant difference for the education process, but other features in the systems allow the lecturers a highly flexible approach to pedagogical issues and support a wide range of pedagogical designs. The possibility to enhance the learning experience by promoting student to student interaction is arguably the most important difference for the students. (Curtin, 2002; Irwin & Berge, 2006; Murphy & Loveless, 2005)

Practice in any field is a response to design rather than a result of design (Wenger, 1998) and it is very important to consider the attitudes of the staff when trying to change the practice in an educational institution. (Scott, 1999)

It follows that if teachers don't have a positive attitude and are prepared to make an effort it will be very hard to implement the use of a LMS in an educational institution and the beneficial effects will probably be small. (Coates, 2005; Collis & van der Wende, 2002; Hepp et al., 2004; H. Mahdizadeh et al., 2008) Therefore we wanted to investigate the attitudes of a group of lecturers to see if they can be expected to make the needed effort to start using a wide range of tools in a LMS if the programs and technology is made available to them. (H. Mahdizadeh et al., 2008).

The respondents

The opportunity to conduct this investigation came up during a course given as a part of the project USo+I: Universidad e Innovación (DCI-ALA/19.09.01/08/19189/160-922/ALFA III-9). It was an introduction to the use of LMS for lecturers in engineering education on Cuba, delivered by one of the authors (Ramon Garrote) from the University of Borås. The course consisted of a two weeks introduction with lectures and workshops with the group gathered together, followed by three months of (part time) distance learning, corresponding to 10 weeks of full time studies or 15 ECTS credits. Throughout the course the open source LMS Moodle (Cole & Foster, 2008; moodle.org, 2010) was used to manage the course, i.e. distribution of documents, for the practical assignments and to establish cooperation and socialization within the group. The main assignment was for each participant to select a course from their practice and adapt the existing course material to be used with a LMS, possibly add some new material and to make plans for the appropriate use of tools such as discussion boards, grade book etc during the course in question. During the workshops emphasis were on cooperation and sharing of ideas while solving the given tasks, the intention was to establish informal groups that could continue working together online or face to face during the distant learning part of the course.



Scope and purpose

The purpose of this study was to examine how lecturers' in developing countries perceive the future use of Learning Management Systems (LMS). If the lecturers have a positive attitude to the use of a LMS, educational institutions should be able to initiate an implementation process, thus increasing efficiency and create new opportunities for educators to address pedagogical issues.(Hossein Mahdizadeh, 2007; Romiszovski, 2003) Another effect of implementing the use of a LMS would be the enhanced possibility to adapt many courses to distance learning, as a way to raise the accessibility of higher education in developing countries. The importance of a deliberate implementation process can be seen in earlier investigations of how LMS is used in developed countries where many lecturers only use the LMS to distribute documents. (Palmer & Holt, 2009) (Ramón Garrote, 2006)

2. METHOD

Each respondent were given a questionnaire in three parts, the first part (A) had five yes/no questions and was answered at the very beginning of the two weeks period to find out if each person had used a LMS before and if they had, then which parts. At the end of the second week part B of the questionnaire, with the same five yes/no questions were filled out to show what parts of the LMS the lecturers intended to use in the near future. The third part (C) of the questionnaire was intended to investigate their attitudes about using a LMS in the future.

The questionnaire used in the survey (English version)

Part A: Experiences with LMS prior to the two weeks introduction course.

What part of a Learning Management System (LMS) have you used:

I have used:	Yes	No
1. Uploading and sharing material	<input type="checkbox"/>	<input type="checkbox"/>
2. Forums and chats	<input type="checkbox"/>	<input type="checkbox"/>
3. Quizzes and surveys	<input type="checkbox"/>	<input type="checkbox"/>
4. Gathering and reviewing assignments	<input type="checkbox"/>	<input type="checkbox"/>
5. Recording grades	<input type="checkbox"/>	<input type="checkbox"/>

Part B: Expectations of future use of LMS in your work, after the two weeks introduction course.

What part of a Learning Management System (LMS) do you intend to use within the next two years?

I intend to use:	Yes	No
1. Uploading and sharing material	<input type="checkbox"/>	<input type="checkbox"/>
2. Forums and chats	<input type="checkbox"/>	<input type="checkbox"/>
3. Quizzes and surveys	<input type="checkbox"/>	<input type="checkbox"/>
4. Gathering and reviewing assignments	<input type="checkbox"/>	<input type="checkbox"/>
5. Recording grades	<input type="checkbox"/>	<input type="checkbox"/>

Part C: Lecturers views on the implementation and use of LMS after the two weeks introduction course.

Simply mark the number that most accurately reflects your view.

Please rate your responses using the following:

1= I fully agree, 2= Agree, 3= Neutral, 4= Disagree, 5= I do not agree at all

1. A LMS can be very useful in the courses I teach.

1 2 3 4 5

2. I need more education and support to use all parts of a LMS.

1 2 3 4 5

3. I need more/better computers and other equipment to use a LMS.

1 2 3 4 5

4. I think I can get the help I need to use a LMS at my workplace.

1 2 3 4 5



5. Many of my students lack access to computers and/or internet.

1 2 3 4 5

6. Many students at my institution lack the computer skills they need to use a LMS.

1 2 3 4 5

7. A LMS will be used by almost all lecturers at my institution within some years.

1 2 3 4 5

8. A LMS can increase the performance of the students at my institution.

1 2 3 4 5

9. A LMS can facilitate the work of the lecturers to a large extent.

1 2 3 4 5

What do you think are the most important differences to expect in higher education from the use of LMS and other educational software? (Access to material, online discussions, students having access to alternative material etc.)

Do you foresee any negative consequences from the use of LMS and other educational software? (Teachers' authority, students attendance etc.)

3. RESULTS

Figure 1: Part A: Experience of using tools in a LMS.

Participant number	Uploading and sharing material	Forums and chats	Quizzes and surveys	Gathering and reviewing assignments	Recording grades
1	no	no	no	no	no
2	no	no	no	no	no
3	no	no	no	no	no
4	yes	yes	no	no	no
5	yes	yes	yes	no	no
6	no	no	no	no	no
7	no	no	no	no	no
8	no	no	no	no	no
9	no	no	no	no	no
10	no	no	no	no	no
11	yes	yes	no	no	no
12	no	no	no	no	no
13	no	no	no	no	no
14	no	no	no	no	no
15	no	no	no	no	no

There were three lecturers with some previous experience of a LMS. However, the experience was only in handling the program, not any experience of using a LMS in their teaching.

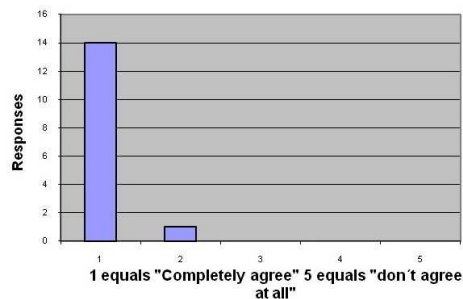


Figure 2: Part B: Intention to use tools in a LMS within the next two years.

Participant number	Uploading and sharing material	Forums and chats	Quizzes and surveys	Gathering and reviewing assignments	Recording grades
1	yes	yes	yes	yes	yes
2	yes	yes	yes	yes	yes
3	yes	yes	yes	yes	yes
4	yes	yes	yes	yes	yes
5	yes	yes	yes	yes	yes
6	yes	yes	yes	no	yes
7	yes	yes	yes	yes	yes
8	yes	yes	yes	yes	yes
9	yes	yes	yes	yes	yes
10	yes	yes	yes	yes	yes
11	yes	yes	yes	yes	yes
12	yes	yes	yes	yes	yes
13	yes	yes	yes	yes	yes
14	yes	yes	yes	yes	yes
15	yes	yes	yes	yes	No

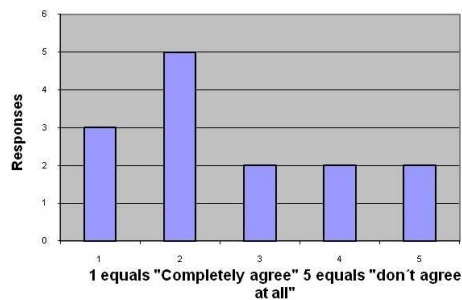
The answers show, that the respondents intend to try most of the major features of a LMS in their practise within two years. It's obvious that they are highly enthusiastic about the LMS and its possible usefulness, also, that this group is not intimidated by their lack of experience and seems to have confidence in their ability to handle the programs.

Figure 3: Responses to the statement “A LMS can be very useful in the courses I teach”.



In Figure 3, it is clear that the lecturers have high expectations on the possible impact of a LMS.

Figure 4: Responses to the statement “I need more education and support to use all parts of a LMS”.

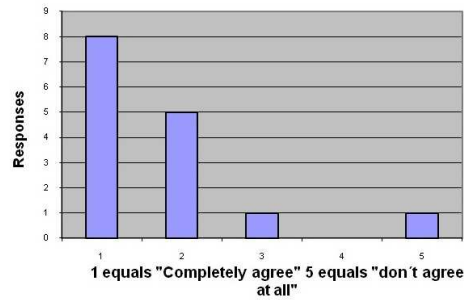


In Figure 4, at the time of answering the questionnaire a majority of the respondents only had two weeks instruction in the handling of a LMS. The result indicates that it takes more than two weeks instruction to give lecturers full confidence in their ability to handle the programs. On the other hand it is worth noting



that a significant part of the group seems to be prepared to start using the LMS at this point. (On this question there were only 14 responses.)

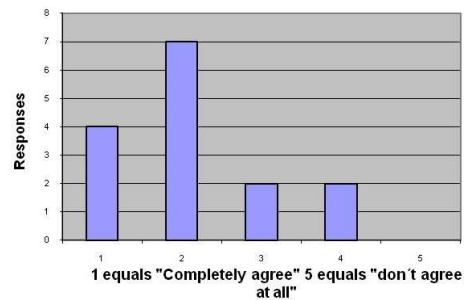
Figure 5: Responses to the statement **“I need more/better computers and other equipment to use a LMS.”**



In Figure 5, the access to computers and internet is of course a critical issue when a teacher decide wether to use a LMS or not.

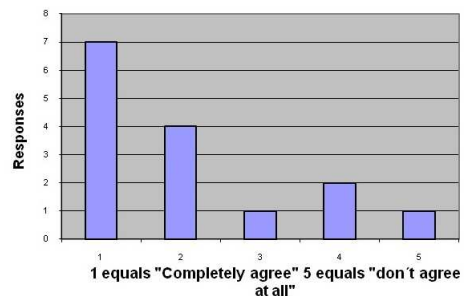
Figure 6: Responses to the statement **“I think I can get the help I need to use a LMS at my workplace.”**

4.I think I can get the help I need to use a LMS at my workplace.



In Figure 6, since no LMS was in use at their institutions this group could not expect help from more experienced colleagues. The response therefore indicates to what extent they feel confident that they can solve problems concerning the LMS themselves or in collaboration with others.

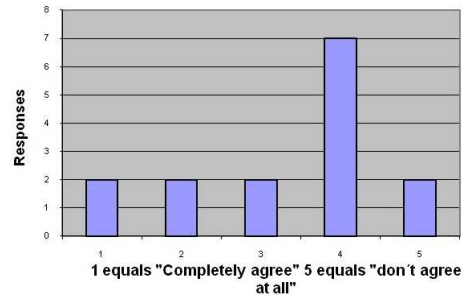
Figure 7: Responses to the statement **“Many of my students lack access to computers and/or internet.”**



In Figure 7, low access to computers and internet is an obvious obstacle for increased use of ICT.

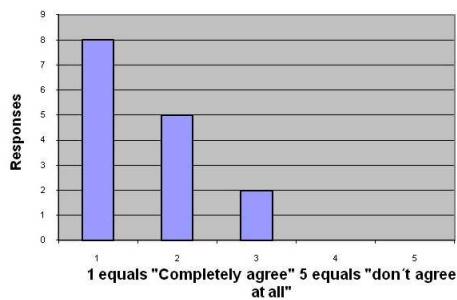


Figure 8: Responses to the statement **“Many students at my institution lack the computer skills they need to use a LMS.”**



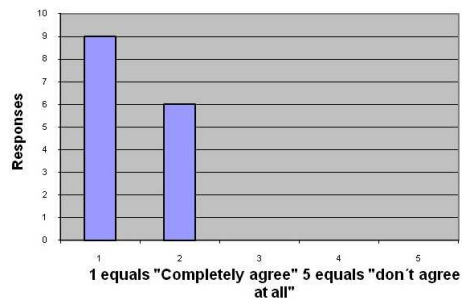
In Figure 8, the result show that most lecturers think that most students will be able to use a LMS if only they have access to computers. So, the problem is the shortage of computers, not the students computer skills.

Figure 9: Responses to the statement **“A LMS will be used by almost all lecturers at my institution within some years.”**



In Figure 9, apparently the lecturers expect the access to computers to increase over the next few years.

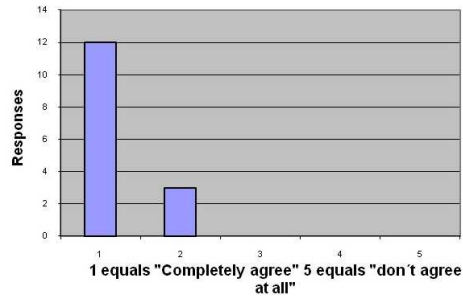
Figure 10: Responses to the statement **“A LMS can increase the performance of the students at my institution.”**



In Figure 10, all respondents believe that students performance can increase with the help of a LMS.



Figure 11: Responses to the statement “A LMS can facilitate the work of the lecturers to a large extent.”



In Figure 11, all respondents are highly optimistic about the effect of a LMS on their work situation.

Answers to the question: **What do you think are the most important differences to expect in higher education from the use of LMS and other educational software?** (Access to material, online discussions, students having access to alternative materials etc.)

The answers to this question clearly indicate that the respondents have very high expectation of positive effects from using a LMS. The most frequent points was that a LMS facilitate access to material for the students, that it allows more flexibility and adds to the learning experience by means of online discussions etc.

Answers to the question: **Do you foresee any negative consequences from the use of LMS and other educational software?** (Teachers' authority, students attendance etc.)

Here the responses are divided in two main groups. One is concerned with problems that may occur when courses is given as distance learning. The integrity of examination processes and a lower quality of human interaction are the main concerns. That is, issues specific to distance learning compared with on-campus activity. The other main concern is the fact that access to computers and internet is limited for people in developing countries. It is pointed out that implementation of a LMS and other information technology in institutions could work as a barrier to higher education for a lot of people if the access to computers don't improves considerably.

4. LIMITATIONS

In this survey the participants were a group of lecturers at Instituto Superior Politécnico José Antonio Echeverría, Facultad de Ingeniería Eléctrica, Havana, Cuba that took part in a two weeks introduction to the use of a LMS (the open source program Moodle was used). It should be noted that the respondents in this investigation were lecturers in engineering education and it is reasonable to assume that this group has a more positive attitude to information and communication technology in general than would a group of teachers in another field. (Denscombe, 2000) On the other hand it is also possible that this group is more reluctant than teachers in developed countries to build their practice on systems that are sensitive to limitations and disturbances in internet access.

5. DISCUSSION

Educational institutions in developing countries that are about to start using a LMS, or are considering to do so, can avoid mistakes that may diminish the potential positive effects by careful planning.(Czerniewicz & Brown, 2009) Looking at investigations of the implementation process and the use of LMS in developed countries a number of important points stand out. If a LMS is made available to educators in an institution but no particular actions is taken to promote the use of it most lecturers tend to only use the tools they perceive as immediately useful, that usually means tools for distributing material to students.(Ramón Garrote, 2006; Weaver et al., 2008) That may lessen the workload on the lecturer's part but will probably not have any significant effects on the learning experience or on the students' study results. To have a positive effect on the quality of education it is important that a wider range of features



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in the LMS are available, not only for the lecturers that choose to use them, but for the average student.(Menchaca & Bekele, 2008) The reason is that many of the reported positive effects are associated with student to student communication and interaction.(Irwin & Berge, 2006; Lesley, 2003; Hossein Mahdizadeh, 2007).

Another important issue is the initial effort necessary to utilize a certain tool in a class. It will always take some effort to introduce students to a new tool. If each lecturer individually decides about the use of a LMS within the courses they teach they might have to spend extra time introducing inexperienced students to the system, and it is still a risk that some students are left out of ongoing discussions, fail to access material etc. On the other hand, if the use of a LMS is fully implemented in an institution, then it will be a one-time effort to introduce students to the system and all students should then be familiar with the common tools. When that level is achieved lecturers can rely on the LMS for course management, for distribution of material, exchanging messages etc. That should give the educators a lot of flexibility in the choice of pedagogical methods and students may benefit from the easy access to educational material and cooperation with each other both on given assignments and in informal discussion groups. Beside the possibilities to enhance efficiency and improve the learning experience for students, an important aspect of e-learning in developing countries is the possibility to offer a wider range of courses off campus, thereby increasing the access to higher education.(Kumar, 2009; Panda, 2005).

In developing countries education is commonly recognised as a critical issue for economic development and distance learning is of particular interest, since it offers the possibility to quickly allow larger numbers of students into higher education.(Hepp et al., 2004) If an educational institution establish a LMS as a standard tool to handle and distribute material to students and to manage courses much material will be conveniently accessible for designing courses as distance learning. Once courses are adapted to a LMS the course material can easily be utilised over again and educators can save a lot of time and effort when planning courses. That should encourage teachers to integrate new material, cooperate in the development of courses and be more readily prepared to adapt their courses to changing demands. Problem based learning (Barrows & Tamblyn, 1980; Björck, 2004) and methods calling for student-student or student- teacher interaction may be more widely adopted. Another potential effect of using a LMS is social and psychological benefits from informal student to student communication and interaction. (Hammond, 2000)

We believe that the investigated group is representative for a vast number of educators in the third world and that the expressed opinions can be taken as evidence that teachers in higher education in developing countries in general are prepared to make an effort to start using a LMS in their practise once they have been introduced to the programs. To establish LMS as a standard tool, the access to computers has to improve for both lecturers and students, and the lecturers need training. From the reactions in the investigated group it can be concluded that three to five weeks of training should be sufficient.

6. CONCLUSIONS AND RECOMMENDATION

A LMS can be a tool for changing and developing pedagogy and methodology in education as well as facilitating efficiency and flexibility for institutions in the management of courses. To get as much effects as possible on educational results, efficiency and access to higher education a LMS must be fully implemented. It means that the LMS must be available to all lecturers and students in an institution, but also that the use of a LMS is a routine part of the lecturers' professional practise. To accomplish that, it is necessary to support staff development and to encourage the lecturers to take an active part in the process of implementation. It is important that the teachers are integrated in the process and that they feel prepared for changes in their practise. Due to the expected benefits of a fully implemented LMS and the highly positive expectations of the teachers, demonstrated in this study, it is the authors' belief that institutions in higher education in developing countries can improve the quality of education and increase efficiency by taking actions to establish LMS as a standard tool. We recommend educational institutions to prepare for the introduction of LMS in the educational practise and make plans for an extensive use of LMS as soon as the access to computers and internet reach the level where students can be expected to access material distributed on-line. If the lecturers are educated in advance and plans are made for an extensive use of LMS it should be possible to avoid the situation of lecturers only using the tools for



distribution of documents and go straight to a practise in which the potential of the LMS is utilized. It is our understanding that an effective process to introduce a LMS and benefit from the features it offers must be founded on a consensus among staff members about the importance of a change in their practise. To reach such consensus we find that three to five weeks introduction courses and training in handling a LMS is sufficient.

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