

## Engineering and Computer Science teachers' use of LMS

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**Abstract:** *This study focused on teachers' use of LMS (Myschool) in the School of Computer Science (SCS) and the School of Science and Engineering (SSE) at Reykjavik University (RU). To get clear view of how teachers in these Schools use the LMS, all courses were examined at the end of spring semester 2011. The results show that there was only slight variation between the uses of the LMS options in the different courses of the two Schools. Some options in the LMS were commonly used, but others were not, e.g. a Syllabus could not be found in all the courses and teachers were not using online exams and discussion forum.*

**Key words:** *Learning management system (LMS), Engineering, Computer Science, Teaching.*

### INTRODUCTION

During the last several years the production of computer components such as single-chip Learning management system (LMS) is today a normal part of most university teaching. From the beginning, LMS were designed with the teacher in mind with the aim to support teaching. Later the focus shifted more onto learning and the learner. Many LMS have been designed and today new options are emerging into LMS to support communication and social networking. A typical LMS system provides tools both for pedagogical and administrative purposes and in general the use of LMS in higher education offers more access to education, more efficient ways of teaching, flexibility and improvement for students' learning experiences [1].

LMS is a learning platform that provides an environment for each user for interaction and discussion and access to information anytime and anywhere. LMS can both capture and store every teacher's and student's activity in each course. Every file the teacher puts on the LMS for the students to view is stored, as well as every assignment, project, or discussion as well as the student's grades. The system also monitors teachers' and students' activities in the system. This ability makes the LMS very useful for collection of information of the teaching and learning process.

According to Solomon and Makara [2], using LMS supports efficient availability of course material and different objects support different activities, e.g. announcements can support learner interaction with content and discussion boards' activity can support students' interaction. The course requirements are shared through the syllabus, assignment introduction, grades and other material. Also LMS is useful for structuring teachers' and students' time, inside and outside class.

A quality LMS has many options that have different objects, some of them seem to be effortless for teachers, but others seems to be more complicated to implement into teaching and learning. Implementation and integration of LMS into teaching and learning practices is problematic [1] and even though LMS have been implemented with the policy of using the system, not all university teachers have accepted or used it systematically.

According to Steel and Levy [1] the focus is often more on the administrative use and information management than the integration of pedagogical use of LMS in university setting. Teachers use different teaching methods and students have diverse learning styles and each course's content can also influence teaching methods and learning styles. It is unlikely that LMS will meet the needs of all teachers in all fields of study. LMS are designed with the focus on administrative and pedagogical standards and it can be difficult for teachers to personalise the learning environment and to adjust it to their special needs in teaching without help from programming experts.

Successful integration and adoption of LMS must be obtained not only by access and availability, but also in terms of how teachers are going to use it and make it an

unforced method of their teaching [2]. Therefore a good LMS must be flexible and encourage different learning methods and support communication.

To have policy how to implement and utilizing the LMS is important for each institution. The teachers need to be advised and supported to post rich content in the system and be active with students through forums and platforms. To do so, both pedagogical and technical assistance by the academic institution is recommended [3].

One of the issues that prevent evolution in good practice using LMS in higher education teaching is that teachers do not adjust their teaching material and methods to the use of LMS. They do not utilise available tools sufficiently. Instead they deliver their traditional teaching methods through the LMS and the best practice loses its intention. The institutions must develop effective policies to motivate teachers to increase their teaching using LMS in a collaborative way. In order to do so, the institution must know the pedagogical factors that can help teachers and educate them in the long term to change their approach to teaching [3, 4].

It is also important to be aware of that there must be harmony between task and technology. Some educational technologists claim that there is not enough congruity between tasks and technology. When integrating technology to teaching, it is rather based on the instructor's pedagogical skills than his/her technological skills alone [5].

When teachers get familiar with LMS and perceive the pedagogical benefit of using it and at the same time discover the time it saves distributing information to the students, they become pleased and positive towards using it [4].

LMS is an integrated part of the higher education community today and a core part of the academic environment and is supposed to create an influence through its functionality and numerous options. In a study of students' satisfaction of LMS use "The findings indicate varied use of LMS, a high level of satisfaction, and low significant correlation between use and satisfaction" [3]. This supports institutions' decisions to invest in LMS for students and faculty to enhance their opportunities and flexibility.

It's very important when practising different teaching methods that teachers use different tools available in LMS. One of them is the discussion forum. It offers opportunities for learners to communicate in a convenient and casual way about the topic and at the same time reflect on their comprehension and understanding. It is a common method in e-learning but teachers who are teaching face to face classes seem not to be using the forum platform in an adequate way. The reason is often the time factor. They think it takes too much time to follow each student's discussions and comments instead of thinking of the forum as an equivalent of a student's diary or blog that supports the students learning [5].

The higher education teachers may not themselves have the experience of learning and taking exams in an online environment and it may be difficult for them to believe in the usefulness of LMS [1]. There are some sceptical voices that consider most LMS to be inflexible and have too much influence on teaching methods. Some even consider LMS to be "a symbol of the higher learning status quo" [6] and want to shift to more Personal Learning Environment (PLE) with more flexibility and communication. It is also stated that the cost of LMS use has grown fast the last years and this provokes questions about the benefits [6].

There has been some research on teachers' use of LMS, but not many in the area of pedagogical implications of using LMS in higher education, but one can say that the impact on using LMS in teaching is in its infancy [1, 4].

To understand better how LMS is used and its influence on teaching and learning it is necessary to know how teachers and students are using it. It is important to know what options they are using and not using, if they are using it in the way it was supposed to be used and if different students call for different use.

This study focused on teachers' use of LMS (Myschool) in the School of Computer Science (SCS) and School of Science and Engineering (SSE) at Reykjavik University

(RU). To get clear view of how teachers in these Schools use the LMS, all courses were examined at the end of spring semester 2011.

### LMS at REYKJAVIK UNIVERSITY

The core of the Reykjavik University's teaching activities is linked to the information system called MySchool. This is an integrated LMS, as well as a registration, application, and student records database, which minimises data entry and hence frequency of errors. The system also contains a database of exchange students and teaching evaluations. It includes all the main statistics that RU provides, both with regards to quality issues and reports that the University has to submit to the Icelandic educational authorities. The system is in both English and Icelandic and has proven extremely useful to the University's foreign students and employees. Surveys show that students and teaching staff are very satisfied with RU's information system, and the University intends to keep using, developing and maintaining it.

The MySchool learning management system offers a special website created for each course. The system is accessible through the internet anywhere. Students can access material and information connected to each course, e.g. booklists, course catalogues, learning outcomes, course syllabuses, lectures, projects, grades, discussion forums, online exams, examinations data base, reference material, attendance records where applicable, etc. Each student gets a personal timetable, organised in the form of a calendar, where the he or she can access directly the material discussed in class that day, as well as an overview of upcoming projects that teachers have registered into the system. Students also have access to information about their study process, records and other personal information. RU's teachers are obliged to use the learning management system, and both teachers and students are very active. Information about how students and teachers are using the system, which includes visits, downloads, input, etc. is accessible to administrators and it can be useful to monitor how the system is used in different courses. Teachers can choose whether they use the Icelandic or English interface of the system.

The LMS in RU has a number of options that teachers can choose to use. The options are categorised into three categories, *About the course*, *Students* and *Materials*, each with a number of options as shown in Table 1.

Table 2 Overview over the options in MySchool

About the course	Students	Materials
Messages	Students' list	Books
Learning Outcomes*	Attendance list	Assignments*
Content*	Groups	Online exams
Teaching Methods*	Grades*	Questions
Assessment Meth.*	Activity	Forums
Syllabus*	Send email	Exam Bank
Time plan		Other Material

\* Obligatory to use

It's not obligatory to use *Message* and the use of could not be recorded directly from the system. The *Time plan* comes automatically from the TAR office. The teachers can also delete options or add more, e.g. *Events*, *Data disk*, *Chat*, *Workbook*, and *Students evaluation*. There is also an option to copy material from other courses. By this the teacher can design the course according to what he/she wants to use and what is useful for the students.

In the category *Students* most options are not controlled by teachers, because the information is provided by the TAR office, e.g. *Students* and *Attendance list* or data that are collected during the semester, e.g. *Activity* and *Grades*. The teachers can decide if

to use Groups, i.e. if they want to divide the students in each course into smaller groups. The Grades are not collected if the teacher does not use the Assignment system.

A few weeks before a course starts some information are already stored in the LMS from the Teaching affairs and registry office (TAR), e.g. *Learning Outcomes, Content, Time plan* and *Students' list*, but the teacher has to put some information there himself before the beginning of the semester, e.g. *Teaching Methods, Assessment Methods, Syllabus* and *Books*. Other options are used during the semester, e.g. *Assignments, Lectures* and *Other Material*.

## METHOD

**Participants:** Participants were all teachers in SCS and SSE in the spring term 2011 and in total they were teaching 104 different courses. On average the courses were 6 ECTS each and the average number of students in the courses was 31.

**Procedure:** The researches got access to the LMS system at RU and for each course 34 options in total were recorded.

**Measures:** A check list was designed for the purpose of the study. It was recorded if an LMS option was used in the course and if relevant how often. The quality of the material stored in LMS was not evaluated.

## RESULTS

Figure 1 shows how many courses the options from *About the course* were used. If the teachers were following the university quality handbook, all \* marked options should be used 100%. Use of *About the course* options in SCS and SSE is similar but the teachers in SCS seem to use the obligatory options a little bit less frequently than the teacher in SSE but it is obvious from Figure 1 that many of the teachers did not use the *Syllabus* option though they were obliged to use it.

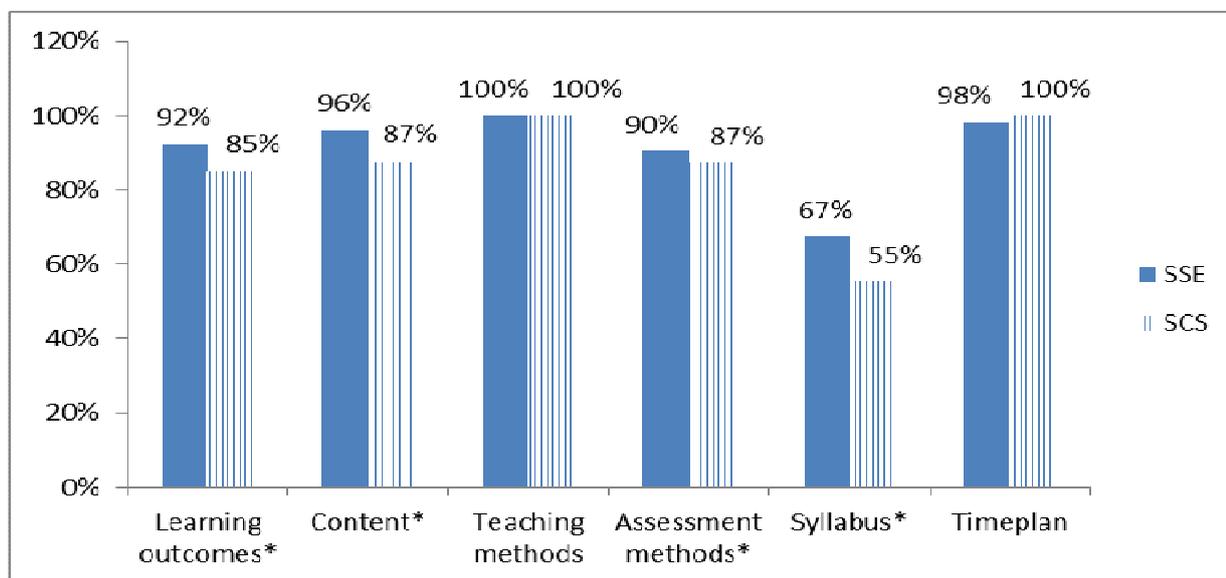


Figure 17 Use of option in the category About the course (\* Obligatory to use)

When we looked closer at this the *Syllabus* could be found under the options *Other Material* but in 17% of courses for SCS and 11% for SSE no syllabus was found in the system.

Figure 2 shows in how many courses the options from *Materials* were used and *Assignment, Lectures* and *Other material* is used by most teachers. The use of the option *Books* was only 50% of the courses in SSE and 70% in SCS and when we

looked closer it could often be found under the options *Other Material*. In 22% of the courses in SSE and 9% in SCS we were not able to find any description of reading material. Not many were using online *Forums* and *Online exams* and *Questions* were rarely used.

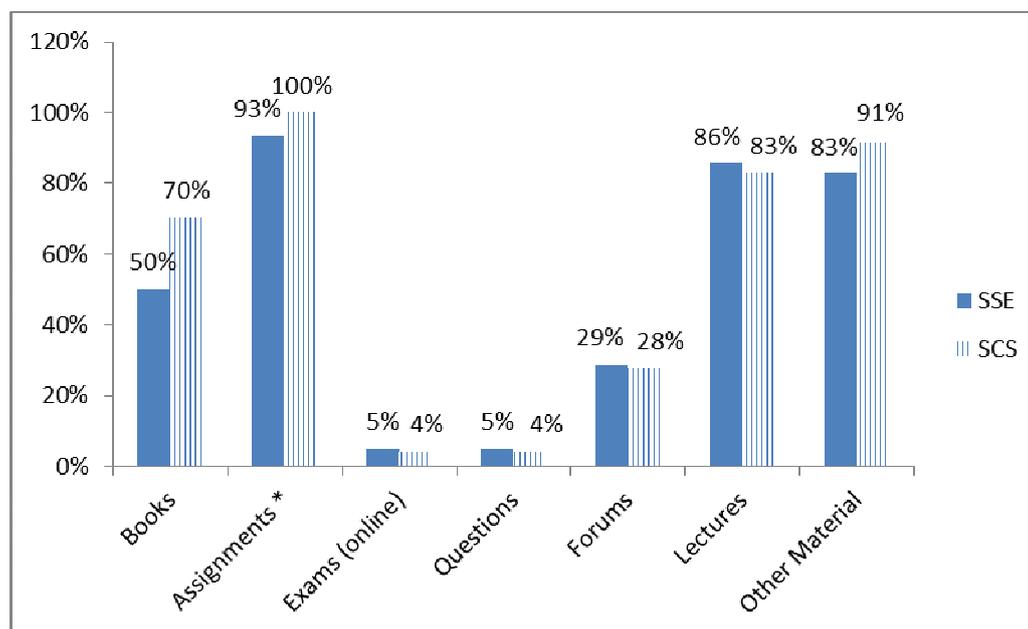


Figure 2 Use of objects in the Material category (\* Obligatory to use)

## DISCUSSION

The results show that there was only slight variation between the uses of the LMS options in the different courses of the two Schools. Teachers were using most of the options they were supposed to use. Options that are not obligatory were not used as much and some options were rarely used. The teachers were mainly using traditional options to distribute material and receive students' assignments but not options which give new opportunities for online cooperation and interactive communication. This indicates that there are some unused opportunities in the LMS, e.g. *Online exams* and *Forums*, and reasons to improve its use.

It is worrying that a *Syllabus* could not be found in all the courses. *Syllabus* is an important document and gives the impression of the teacher and his pedagogy. It contains description of the course and gives the students instructions of the plan, structure and organisation of the course, as well as stating its objectives and goals. It can also guide the student on how to study and when to work on different assignments. The syllabus can support students learning and should be used in every course. An online syllabus allows the teacher to use links to documents and websites and by that design a living syllabus that can easily be updated and changed. It is important for the students to have all the information about each course and get a guidance and support from the teachers. The Schools should encourage teachers to put a syllabus into each course. Here the quality of the syllabus was not evaluated but it is important for teachers to be aware of the relationship between learning outcomes, teaching methods and assessment and this should be presented in the syllabus.

It is of surprise how few of the teachers used *Online-exams* and *Questions* because these are very useful options, where teachers can design different types of online exams, from multi-choice exams to written exams, and a mixture of these options. As an example, the LMS checks multi-choice exams and grades the students automatically. Online multi-choice exams can save teachers a lot of time when grading students. Online exams can call for adaption to a different educational environment for

the faculty and the students. I view of the fact that many of today's students have good digital skills the main problem may be the teachers. The LMS supports online exams and should therefore increase the popularity among teachers. Fear of students cheating on online exams might be a factor that detracts teachers from using online exam. King, Guyette and Piotrowski [7] found out that students were more likely to have lax attitudes towards ethical issues and cheat on online exams, but this is in contradiction with recent studies that have found no evidence of cheating in online exams [8]. So, cheating may not be a significant problem that teachers need to focus on.

It came as a surprise that information about books and reading material could only be found in around a third of the courses in the study. The explanation may be that some courses were based on practical training that does not include much reading material. Nevertheless reading material should be a part of all higher educational courses and this need to be looked into.

The *Forum*, or the discussion board, is the main option for communication in the LMS but only one third of the teachers were using this option. Research indicates that forums can improve students' collaboration [9, 10], support critical thinking [11] and improve students' empowerment [8]. It would be of interest to know what is the main obstacle for more frequent use of discussion forums among engineering teachers, are they not familiar with the positive influence the use of forum can have or do they not see the reason to encourage students' discussions of technical subjects?

This study calls for more research into the quality of LMS use, the material, the use of different options and the attitudes of teachers and students. The main limitation in this study is that we looked only at the data from the LMS system and now when we know how teacher use the system we need to know why they are not using new options like online exams. The technology is there and an access to it is not an obstacle.

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**The paper has been reviewed.**