Experience in using a Learning Management System (Göteborgs Universitets Lärplattform - GUL) for integrated course design

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Abstract

Integrated course design needs a developed structure based on pedagogic principles in order to keep track of learning outcomes, assignments, learning resources and lectures. A Learning Management System (LMS) is tested for the learning outcome experience of 24 students that took a Quaternary Geology course at University of Gothenburg. A student survey with a questionnaire and a personal feedback session were analyzed in order to receive objective criteria to evaluate the usefulness of the LMS for the distribution of learning resources. As a key finding students will need to be exposed in hands-on exercises to the LMS in order to take full advantage of the offered online information and resources.

Theoretical framework

Learning management systems (LMS) have become widely used in the University environment and are available to facilitate course development. Learning management systems can be used as E-learning platforms, course management systems and distributed learning systems (Coates et al., 2005).

LMS offer the course responsible to

- structure the course content and make learning outcomes and resources easy accessible for students

- communicate in form of chat, instant messaging and discussion forums
- integrate assignments (multiple choice, collaborative work and feedback) (Coates et al., 2005)

Even though there is a growing use of online technology to increase the learning and teaching outcome of courses, there are not many studies on actual use and pedagogical effects of LMS (Coates et al., 2005; Hutchings et al., 2011). LMS offer a management tool to facilitate a quick and easy identification of learning resources, communication and online forums, assessment work, collaborative work and pre-assignment/flipped classroom resource delivery (Ryan et al., 2000). Some studies identified the pedagogic positive effects of allowing students an increased access to material and learning resources and as such enhancing the learning experience (Gillani, 2000). The right timing to give the students access to the relevant learning resources is though an important factor in the learning outcome as has been shown in previous studies (Govindasamy, 2002).

The aim during the design of the course was to follow pedagogical principles for an integrated course design and use a LMS to structure in the best possible way (Govindasamy, 2002). Fink defines 'Integrated Course Design for Significant Learning' as a process that has to integrate the three major phases of (Fink, 2003):

1. Strong Primary component building (Identification of learning goals, situational factors, feedback and assessment procedures, selection of teaching/learning activities)
2. Assembling components into a coherent whole (Build structure of the course, creation of the instructional strategy, integrate the course structure into an overall scheme of learning activities)
3. Finish Important Remaining Tasks (development of the grading system, find solutions for potential problems, write course syllabus, plan evaluation)

An important objective to integrate in learning resources is to overcome bottlenecks in student learning. A bottleneck is an important concept that students need to understand in order to proceed in a scientific disciplinary (Pace and Middendorf, 2004). In Geology for example the understanding of Geologic Time is a typical bottleneck. In a previous study it has been shown that a problem-based learning method using real-world problems helped students to overcome this bottleneck (Zhu et al., 2012).

Introduction

Here, I present an experiment that invented integrated course design for a Quaternary Geology course at University of Gothenburg using a LMS as a tool of structure, distribution of course information and pre-assignments. The course is implemented in the LMS of University of Gothenburg (Göteborgs Universitets Lärplattform – GUL) (http://gul.gu.se/public/courseId/38096/lang-en/findPublicEvents.do). I present the feedback of 24 students that took the course in September 2014 based on an anonymous student survey and personal feedback meeting with the students. The results and experiences are discussed on the background of published experiences with LMS in other fields.

Since 2007 I have been teaching 'Quaternary Geology' at the University Centre in Svalbard and for many years I have been wishing for an integrated course structure, in order to structure the learning experience and make learning resources easier accessible for students. UNIS has no own Learning Managing System (LMS) and therefore, all course bits and pieces have to be distributed via a simple file system on the UNIS server. This makes it sometimes difficult for the students to find information that belong to the different course elements as information is split into lectures, literature etc. The University of Gothenburg has its own LMS, the Göteborgs Universitets Plattform (GUL) and the aim of this paper is to present the pedagogic concept of an integrated course concept that aims to:

1. present a clear structure and make it easy for students and teachers to find all necessary practical and assignment information for each course element
2. identify the learning outcomes for each course element in LMS
3. offer the possibility of flipped classrooms by identification of relevant movies for bottleneck learning objectives and literature that the student should read and watch before class
4. offer access to original papers and book chapter that the students should read for each lecture/exercise
5. build the complete structure of the course LMS on the base of the exam questions (pyramid tests) and learning objectives of the classes (integrated concept)

This paper describes how the LMS was used to develop a transparent Bachelor course and how this can provide a more efficient learning environment, as learning outcomes were clearly identified in the LMS system.

The course was evaluated by 24 students after finishing the course anonymously and also in a personal evaluation feedback with a specific task to group the learning experience into

- things that were good
- things that can be improved

The feedback of the students and own personal reflection on the course content and structure were used to reflect on the use of the LMS system as a tool to offer students an integrated Bachelor course with the focus on easy accessible course information.

Procedure

The course schedule can be checked by the students and the course teachers online on GUL (Göteborgs Universitets Lärplattform) (Table 1). Here they find practical information about the Date, Time, Teacher and Room of each lecture and exercise. In the row of the table they find the subject of the class (lecture or exercise), with a link to the pdf-file of the lecture/exercise. Therefore, they do not need to look in another folder of the platform for the lecture, but can only click on the link of the class subject. Also the information about assignments and literature they will need to read for the exams can be found for each class in the same row of the table. These assignments can be links to short videos that explain a bit more background of the class, or a short paper, or the pages in their textbook (Benn and Evans, 2010) that they should read for the exams of the course. Links to original papers were given directly in the table and students only needed to click on the original paper in order to get the pdf file.

Time	Room	Subject	Assignment
9:15-12:00	Nimbus	Class 1: Intro, purpose of course, pratical info on assignments, pyramid tests, excursion, Role of glacier systems on the surficial deposits of Sweden	SGU_Jordartskart Jord - fran-istid-till-nutid
13.15-15:00	Nimbus	Class: Glaciology I - Mass balance, glacier types	B&E: 3-13 (intro), 28-30 (thermal regimes), 37-42 (mass balance) The future of glaciers Mass balance measurement- accumulation Mass balance measurement - ablation
09:15-11:00	Terroir	Class: Glaciology II - Thermal regimes, glacier hydrology	B&E: 46-47, 644-647 (ELA), hydrology (58-60, 62-72, 76-81) Underneath a glacier time lapse Greenland Ice sheet slip
13:15-15:00	Terroir	Class: Glaciology III - glacier motion, dynamics, sea level change	B&E: 107-111 (stress-strain), 142-145 (dynamics basics), 163-164 calving glaciers, 186-196 glacier surges

Figure 1 Part of the online schedule of the GVG310 course, including links to pdf-files of lectures, short videos on youtube and vimeo, reading assignments

Pyramid tests

Pyramid tests became the heart of the integrated course design of the Quaternary Geology course at University of Gothenburg. Ólafur Ingólfsson, Professor in Quaternary Geology at the University Centre in Svalbard and University of Iceland developed pyramid tests a couple of years ago at University of Iceland. Pyramid tests are developed to give the students an enhanced learning experience by combining theoretical shorter exams with reflective discussion and direct feedback (Figure 2). Figure 2 shows the concept of the pyramid tests. In a first step, students will have to answer multiple-choice and short essay questions in 30 minutes. They will get 20 minutes to discuss in small groups their answers and will get the chance to check answers. After that, they will hand-in their tests and the course teacher will reveal the correct answers to the test. The second step of the pyramid is regarded as the step where students gain two experiences: firstly, they will have to chance to discuss their answers with other students and receive confirmation of their answers, or be able to argue for their answers. Secondly, if they changed answers after the discussion to from a correct answer to a wrong answer, they gain confidence in their own knowledge capacity and will in following tests gain a stronger confidence to stick to their own answers. The Quaternary Course in Gothenburg consisted of four pyramid tests that summarized the learning content of each a week: glaciology, sedimentary environments, glacial history,

Paleoglaciology and glacial landforms. The course content was developed to build up the student's knowledge in each of these fields by

- Pre-assignments in form of short videos that explain bottleneck learning objectives
- Pre-assignments in form of textbook chapters and original papers that cover the content of each lecture/exercise
- Group tasks: a short video about a method used in the field, a fieldwork report, a ArcGIS map and map description
- The complete structure of the course was designed in that way that keeping in mind which questions the students should be able to answer, learning material and resources was chosen for the LMS.

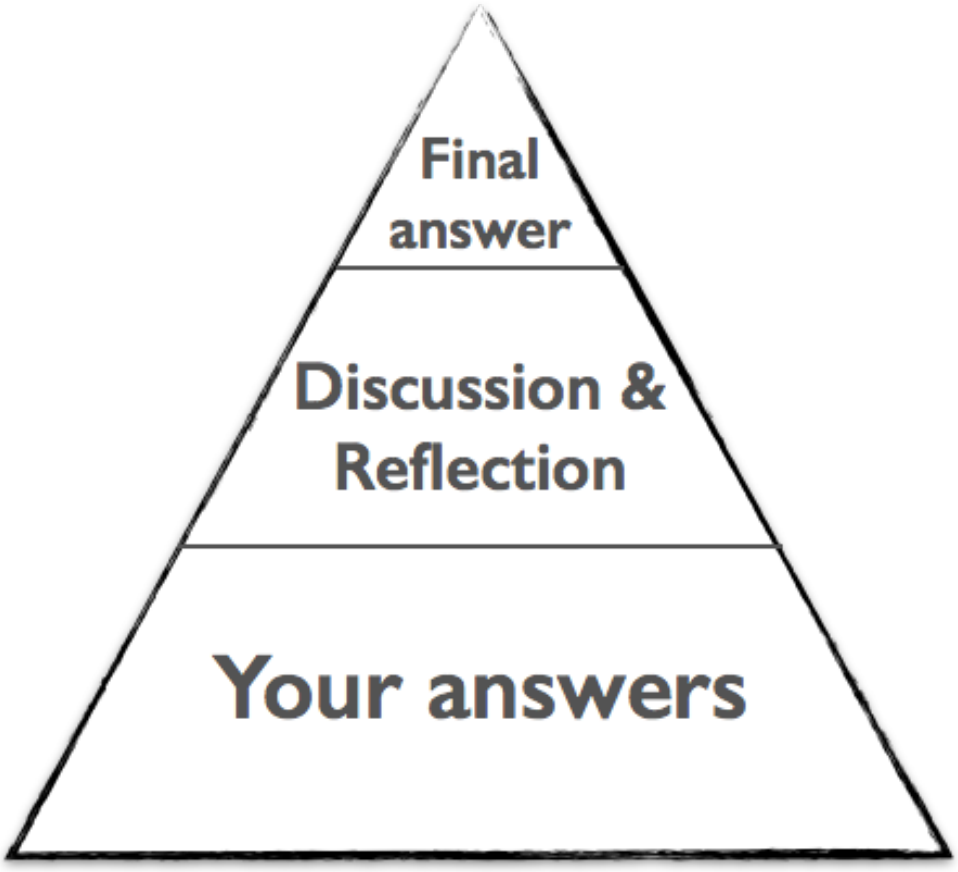

Figure 2 Pyramid test, developed by Ólafur Ingólfsson, contains 30 minutes of a multiple choice and small essay tests, 20 minutes of discussion and reflection in small groups with the chance to change answers, hand-in and the presentation of the correct answers

The students were interviewed after the course in order to retrieve a qualitative feedback on the course communication and accessibility to learning resources.The final course evaluation included specifically what students think about the LMS system and its used for the course and how this could be improved.

The LMS was in first hand used to structure the integrated course concept. I started with the development of the exam questions with regard to which learning outcomes I was hoping the students would take home. Based on the aimed learning objectives I created a flow of lectures, exercises, a fieldwork week, a mapping exercise and group work to write a report of the fieldwork week and a map description. Whenever I added a class or exercise in the LMS table, I added the literature that students needed to read beforehand in addition to short videos. The structure of the LMS helped me to actually keep focused on the learning outcomes and to go back to course contents and if those actually cover what I wanted the students to experience and learn.

Questionnaire for the student survey:

Please, answer the questions on a 10-point grading scale, with 1 representing unsatisfactory and 10 representing excellent.

1. Did you find it easy to find information about assignments for each class?
2. Were the short videos useful for your learning outcome in addition to the classes and assigned literature?
3. Was it easy to find the literature for each class?
4. Were the literature links useful for your learning outcome and your performance in the exams?
5. Did you receive enough handouts?
6. Did you find that the schedule was suitable as communication tool for the class?
7. Is GUL enough as channel of information? If not, which other communication channels do you suggest?

Results

Out of 25 students that finished the Quaternary Geology course, 24 students participated in the survey.

NR OF STUDENTS FOR EACH SCALE

QUESTION NR	1	2	3	4	5	6	7
1							
2					1		
3					1		8
4					10		2
5					8		7
6	2					12	3
7	3					1	1
8	14	2	3	2	4	6	3
9	4	2	2	6		3	
10	1	20	19	16		2	

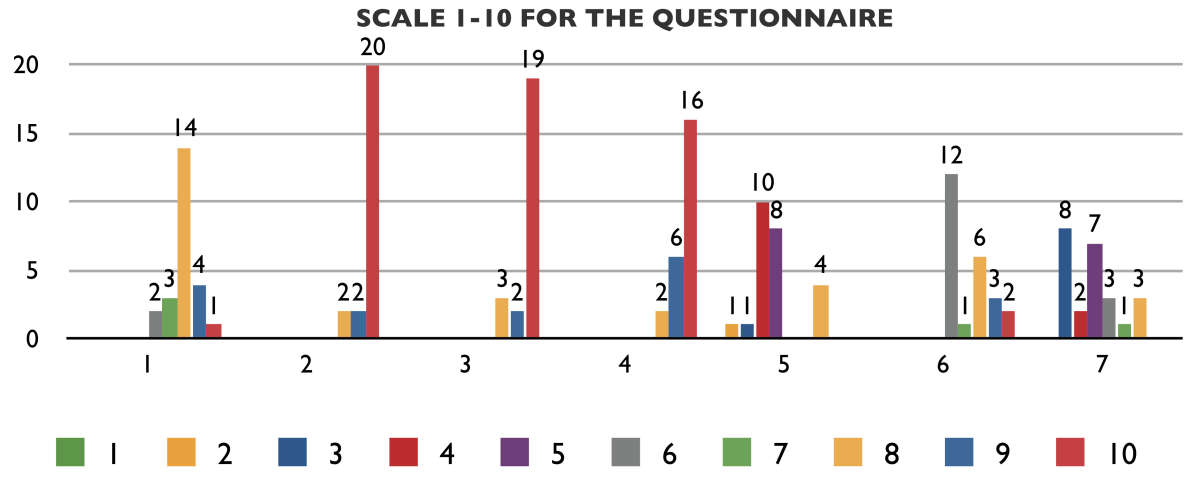

Figure 3 Results of the student survey on a scale from 1-10. The seven questions are given in the text.

The answers were given on a scale from 1-10 and the answers were blocked into 1-3, 4-7, 8-10 groups. 1-4 represents a negative experience, 5-7 a quiet ok experience and 8-10 a very good experience (Figure 3).

The survey analysis revealed that 79% of the students found it easy to find the assignments per class. All students gave a positive feedback for the pre-assignments to watch short

videos for bottleneck topics. 100% of the students found it easy to find the literature for the different classes and topics. They also gave excellent feedback for the used course literature, especially the course textbook.

On the other hand students were missing that they didn't receive many handouts as course information or description of assignments. 8.3% students clearly criticized missing handouts, while 75% were not content with missing handouts. Only 16.6% of the students didn't criticize the lack of handouts. All students were quiet happy with the LMS system as a communication tool for the course, but 87.5% wished for improved course communication with additional communication channels. More specifically, a course handbook was on the top priority list of the students, in order to receive all course information and assignments in a printed version.

Discussion

The personal evaluation with the students helped to place the answers of the questionnaire into perspective and to find the topics that need improvement for the coming year in order to enhance the learning experience of the students.

The main criticism of the course communication is the missing of a handbook. Basically all information about the course content is transferred via the LMS schedule and an introductory lecture. The introductory lecture with all information about the LMS, practical information, pyramid tests and course assignments is saved as a pdf file within the schedule of the course. However, students wanted to receive a printed 'handbook' in order to find information regarding the assignments and graded parts of the course. This experience might be compared to the experience described by (Beatty and Ulasewicz, 2006). Students might need an in-class exposure to the LMS system in order to learn all its features and get acquainted to using this system instead of printed handbooks. When I started the course, I assumed that students were already acquainted with the GUL system. However, other geoscience teachers do not use GUL in such an extended way as I did. Therefore, an exercise on the first day exposing students to GUL and the content of the course might well make printed handbook unnecessary, according to the experience described from another study (Beatty and Ulasewicz, 2006).

Students were very fond of small videos that explained bottlenecks for the topics of the course. Short videos were also integrated in lectures, but in addition students were able to

find bottleneck videos in the LMS. For every lecture, students would find links in the assignment directly to these bottleneck videos. I also mentioned these videos in my in-class lectures.

Students found it easy to find literature and gave excellent feedback for the used textbook (Benn and Evans, 2010). In the personal evaluation, though it crystallized that they would prefer to receive course literature already well ahead of the course, and not only a week before course start. The course is organized as a block course running over 4 weeks in September and most likely, the workload for reading papers and chapters in the text book is overwhelming for undergraduate students. If the course would stretch out over a complete semester, this problem would most likely be reflected upon as a minor hinder in learning experience, as more time in-between lectures is available for the students. Students only get access to GUL a week before course start and therefore the course literature needs to be distributed to the students by other means than GUL. Therefore, I am planning to communicate the references for the courses a couple of weeks ahead by e-mail.

I made the same experience than what is described in literature, that students did not use the communication channel via the GUL message-tool. They still preferred to see me personally, or writing e-mails. Beatty and Ulasewicz (2006) described that in the beginning only 15% of their students used LMS and were able to log on and started posting messages for the class. In order to animate students to use the forum in the LMS, they invented an in-class, non-graded practice where students learned in groups how to navigate the system and this increased the participation in online forums up to 100%. Though in that study the teachers used the online forum to grade answers to posted questions, while I used weekly pyramid test as a means to grade the theoretical part of the course.

Beavy and Ulasewisz (2006) describe the challenge to bridge between online and in-class activities. Geology is a very practical based field and a week of the Quaternary Geology class is taught in the field in Norway. Parts of this week are excursion-like, but most of the time, students have to solve small tasks in groups and write a report about their observations and interpretations, presenting data they have gathered in the field. Another 4 days of the course are spent in the field to learn Quaternary mapping and in the end to present an ArcGis map with map description. Therefore, much of the taught contents of the course could not be taught online. In the personal discussion, it was therefore not an issue that students felt that online and in-class lectures/assignments would double-up.

In conclusion, I got a very positive experience with using an online LMS in order to structure my course content and all attributed learning resources for the students. It helps to keep on track and double check if all learning outcomes are covered by literature, lectures, exercises, group work and pre-assignments to overcome bottlenecks.

Conclusions

The use of the Learning Managing System GUL (Göteborgs Universitets Lärplattform) is intuitive and is an excellent tool for keeping track of learning resources with regard to the learning outcomes.

The main criticism of the students was the missing printed handbook for the course and the late disclosure of course literature. In order to expose students to GUL and all available learning resources I will invent an hands-on exercise at the very beginning of the course that will introduce the students to all used GUL options in the class. Course literature will be distributed several weeks before the course by e-mail.

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