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Combining assessment elements into a holistic assessment concept

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ABSTRACT

Many courses within higher education are assessed by "faculty standards" sometimes based on the implicit assumption that "it has always been like this, therefore it is the best". Selecting and combining different assessment modes in an effective manner for a particular course are central issues. The process does not always entail a simple and straight-forward decision making. The main purpose of this paper is to examine the current assessment modes and practices at Lund University's Faculty of Engineering (LTH) and provide suggestions for improvements. This study is based on the combination of a literature review in the field of teaching and learning, on empirical material obtained from surveys and group discussions with 22 teachers at LTH, as well as on experiences of the authors of this paper in their capacity as course leaders and teachers. The study focuses on the critical examination and analysis of issues concerning some main forms of assessment (especially project work and written and oral assessment) applied in the five selected courses. The results show that both teachers and students are more positive to the project and written examination than oral assessment. Based on the results of the analysis and the experiences of teachers, the paper provides advice for improving the quality and efficiency of assessment through combinations of assessment elements.

Table of Contents

1. INTRODUCTION

1.1. Background

The point of departure of this study is the need for guidance that we, the authors, all perceive in our capacity as teachers at Lund University's Faculty of Engineering (LTH) when we are faced with the task of designing, adjusting or just implementing modes of student assessment within courses. To first teach something and then assess what students have actually learned and gained is, not a straight-forward exercise. When choosing between assessment instruments and modes, teachers have to strike balances between a multitude of constraints and objectives: For example between, on the one hand, what is practically possible given the group size and the time available to teachers, and, on the other hand, what is effective when it comes to helping both students and teachers to achieve the goals defined in the learning outcomes of the course.

Many courses on university level are assessed by "faculty standards" sometimes based on the implicit assumption that "it has always been like this, therefore it is the best". What we suggest in this study is that it can be useful to consider different forms of assessment. Particularly, we suggest that combinations of different assessment forms into a comprehensive concept may offer opportunities for easier adjustments of teaching practices. A good combination of assessment elements can inspire and motivate both teachers and students to improve their performance and engage in deep learning rather than in surface learning.

In this presentation we aim to critically examine our suggestions and discuss the boundaries of their validity. Can we find and formulate any guiding principles that are meaningful to all of us, who work within and represent a quite diverse spectrum of academic traditions – within the common administrative environment of LTH?

1.2. Methodology

This paper is based on a qualitative study that combines different types of data and research approaches:

Literature study: We started our investigations by conducting a review of a number of academic papers and other material on topics relating to student assessment in higher education. The selection was largely pre-defined as a list supplied to us within the framework of a teachers' inspirational course at LTH that we attended together in the period December 2007 to April 2008; however, we also added a few references after conducting a literature search. The literature inspired us to perform this study. The complete literature list used is given in Appendix 1 In this paper, however, only parts of the whole literature corpus are referred to.

Empirical study: Our main sources of input for this paper are empirical: On the one hand it is based on the conduction (as part of the curriculum of the inspirational course referred to above) of a so-called *Participants' Seminar*, further described in section 2.1. On the other hand it is collected from our experiences as teachers, which for the purpose of this study have

been concretised in the presentation in section 2.2 of assessment-related challenges encountered by ourselves in a selection of five LTH courses. The authors of this paper selected one course each, of which he or she had recent experience as course leader or co-ordinator.

1.3. Theoretical platform

Within higher education, assessment – or, in Swedish: *examination* – has multiple purposes. For example, one can discern the following three: (i) the pedagogical purpose, with a focus on fostering and encouraging continued learning (c.f. Rust 2002; Gibbs & Simpson 2005; Lindberg-Sand & Olsson 2008), (ii) the performative purpose, which is manifested in the official verification and certification of the extent of students' capacities (cf. Dahlgren & Fejes 2005; Lejk et al. 1996; HEO 1993), and (iii) the indicative purpose, which is to evaluate (often quantitatively) the degree of success or failure of the teaching and learning process for a particular edition of a course (cf. Cizek 2002).

Another way to theoretically conceptualise the teacher's task of assessing students is to distinguish between two different assessment modes, separating formative assessment, used for feedback to both students and teachers, from summative assessment, used to grade students according to their performance. The difference between the two can be illustrated with a metaphor: "when the chef tastes the sauce, it is formative assessment, when the customer tastes it, it is summative" (Biggs 2003, p 140-141).

Alongside the purposes and modes of assessment, there is one further dimension that is dealt with in this presentation, namely the quality of achieved learning. This aspect is often referred to as a progression from surface learning, at one end of the spectrum, towards deep learning, at the other end (Biggs 2003). In particular, Benjamin S. Bloom's "taxonomy of educational objectives" (1965) has been widely spread (and adjusted) as a way in which to categorise, in a systematic fashion, criteria for different learning levels along this dimension. Bloom's taxonomy is a representation in six discrete steps from most superficial to deepest learning by 1: knowledge, 2: comprehension, 3: application, 4: analysis, 5: synthesis, 6: evaluation (Anderson et al. 2001). Both teaching and assessment should strive to create deep learning and a high level on Bloom's taxonomy. This means that students should be able not only to memorize and retell a thing, but also to compare, transfer and synthesize the information that they present. In contrast, surface learning is more concerned with short-time memory (studying for the exam, forgetting about it directly afterwards) and the cognitive level of understanding is in general lower.

The Swedish system for higher education is highly modular, consisting of a series of separate courses that are assessed independently of one another. In some cases, but far from always, students have to pass certain courses in order to proceed to subsequent courses (Lindberg-Sand & Olsson 2008). Having passed an appropriate collection of courses, students are awarded their degrees (in Swedish, *examina*). Course assessments are carried out by the academic departments that give courses, while degrees are awarded by the university or college, based upon students' accumulated assessment records.

For the purposes of this presentation, which – on the level of the separate course –discusses the combination of different elements into a comprehensive "assessment concept", all parts of a course curriculum that are compulsory are defined as *assessment elements* within that course.

2. EMPIRICAL MATERIAL

2.1. Teacher polling at *Participants' Seminar*

In February 2008, as part of a teachers' inspirational course at LTH, we conducted a *Participants' Seminar*[1] on the topic of student assessment. We chose to do this interactively. The attendees (about 15 teachers) were presented with a course in Timber Engineering (VBK032, shortly described in table 2, see also appendix 2 for course description and learning outcomes), for which they were asked to propose an assessment concept. In a first survey, everybody was asked to recommend an assessment concept or assessment elements, but also to tell what assessment elements they advise against. Here, the participants could themselves define assessment elements. After that, they were divided into groups of 3 to 4 persons. Each group was then given 30 minutes during which to discuss the applicability of one particular type of assessment element for the Timber Engineering course. The results from that group work were then presented for the other groups. The different assessment elements that were discussed here were:

- Seminar with oral presentation of design project with 2D- or 3D-visualizations
- Individual oral examination
- Project work, report writing with continuous supervision
- Written home assignment, with feedback-seminar[2]
- Final written examination.

After final discussion, all participants were asked again to recommend or advise against assessment concepts for this course (second survey). The results of the two surveys are shown in Table 1. It was made clear both from the surveys and from the general discussion that most of the participating teachers recommend project assignments, either with or without oral presentation and opposition/defence. It is interesting to see that oral examinations are recommended and advised against by about an equal number of teachers, whereas more teachers are positive to written examinations than against. Many teachers claimed that oral examination would be too time consuming for the teachers. However, only a few of the participants actually had any experience with this method. Oral examination is discussed further in section 3.1.3.

At the end of the seminar an open poll was concerned with which assessment concept of the five concepts prepared in group work each teacher would recommend for the Timber Engineering course. The results were as follows (number of votes in parenthesis, teachers were allowed to vote for more than one concept):

1. Seminar with oral presentation of design project with 2D- or 3D-visualizations (15)
2. Project work, report writing with continuous supervision (11)
3. Written examination at home, with feedback-seminar (9)
4. Individual oral examination *and* Final written examination (5 votes each).

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[1] In Swedish: *deltagarundervisningspass*.
[2] In Swedish: *hemtentamen*.

It is interesting to see that of the approximately 22 voting teachers (including course teachers and authors of this paper), many chose to vote for several assessment concepts (total of 45 votes), i.e. they recommend a combination of assessment elements.

In reality, the timber engineering course has during many years been assessed by a final written examination (5/6 of grade) in combination with a written project report (1/6) and a compulsory laboratory test with written report (fail/pass). The outcome of the discussion and survey was that the current assessment form (final written exam) only came on fourth place as a "preferred mode of assessment". Most teachers instead preferred more active assessment forms like project work in combination with presentation seminar. There was a great discrepancy between the teachers' opinions, showing the complexity of selecting assessment form. A conclusion for the teacher of the Timber Engineering course might therefore be to increase the importance of the project work, e.g. by introducing a presentation seminar and opposition and at the same time reduce the importance of the written exam. One possibility would be that project work and exam count equally much. Then the exam should only cover the theoretical parts whereas the project work assesses the more practical design skills.

Table 1. Results of the polling surveys conducted in our Participants' Seminar on 13th February 2008.

	recommended assessment elements		assessment elements advised against	
Assessment elements	first poll	second poll	first poll	second poll
Project assignment	4	4	0	0
Project assignment with seminar/presentation	7	5	0	0
Meeting	0	0	1	1
Problem based learning	0	0	1	0
Group work / group assessment	0	0	1	1
Seminar in small groups with presentation, student and teacher opponents	1	1	0	0
Seminar in large group	0	0	1	0
Laboratory experiment	1	0	0	0
Oral exam	4	2	3	2
Written exam (optionally with feedback-seminar)	7	5	3	4
Written individual home assignment	2	1	3	2

2.2. Assessment related problems in five LTH courses

Complementing the empirical input collected in the Participants' Seminar described in the preceding section we bring into the discussions of this report issues that originate from our own professional experiences as teachers at LTH. The issues referred to are collected from within a selection of courses. These five courses, which also serve as a means by which to provide a concrete foundation for the further discussions in this report, are presented in brief in Table 2.

For each of the five courses, a separate issue, or a limited complex of issues, identified by us (as course leaders) as a central, assessment-related problem, is expounded on below.

Table 2. Selection of five courses at LTH

	Industrial design project III, sustainable development (IDE110)	Timber Engineering (VBK032)	Climate: Science and Politics (MIV220, FMIN01)	International Physical Distribution (MTT045)	Water (VVR145)
Study points / credits	13	6	6 / 7.5	7.5	9
Study programme	Industrial design	Civil engineering	All LU / LTH	Industrial management and logistics	Civil engineering
Year	4	4	4-5, PhD-candidates	3-4	2
Compulsory / voluntary	Compulsory	Voluntary	Voluntary	Compulsory / voluntary	Compulsory
Term (number of weeks)	8 weeks over whole term	4 (7)	1-2 (14)	2 (7)	1-2 (14)
Number of students	25-30	25-30	10-20	40-50	100
Level	Advanced	Advanced	Advanced	Advanced	Basic
Language	English	Swedish	Swedish	Swedish & English	Swedish
Teaching	- 3 days study trip - 20 h lectures - 80 h own research, 60 h individual project work	- 20 h lectures - 22 h exercises - 118 h individual work	- 22 h lectures - 10 h seminars /exercises, - 118 h individual work	- 34 h lectures - 18 h exercises - 120 h project and individual work	- 50 h lectures - 38 h exercises
Number of assessed parts	2	3	4	4	5
Assessment	• Project research done in groups • Presentation of project in group seminar with 2D- and 3D-visuali-zations	• Project assignment (groups of 2, no individual grades, counts 17%), • Final written examination (counts 83%). • Laboratory test with written report (fail/pass).	• Minimum attendance rate requirements • Written test • Individual essay with presentation and discussion seminar • Home assignment with feedback seminar • Re-sit: oral exam	• Project work: report, presentation and opposition (40%); • Written exam (60%) • Attendance at guest lectures and field trips • Case study at a company or alternative exercise	• Three written home assignments • Two exams. All parts are marked and grade is calculated as average of assignments and exams. • Re-sit: oral exam

2.2.1 Industrial Design Project III: Sustainable Development (IDE110)

Some design-students are not used to read literature and find it sometimes difficult to understand the importance of understanding society and nature on a systemic level to be able to make good decisions. Since problems related to sustainable development must be dealt

with from a multidisciplinary perspective, a common reaction from students is that "this is not design-education."

The lack of a common platform of knowledge that can cater for meaningful and informed discussions makes the students feel frustrated. Since the research-phase of the projects on which assessment is based is only presented in seminar form, while the project can be carried out in groups, some students can "avoid" to be assessed during the course.

2.2.2 Timber Engineering (VBK032)

The course literature consists of a comprehensive course book in Danish and a handbook in Swedish plus some handouts. The handbook is not comprehensive; it gives only detailed information on parts of the course content. The teacher has observed that the students do not read or actively use the course book written in the Danish language. However, the assessment system is designed to assess both theoretical and practical parts, and for the theoretical part, the course book has to be read or extensive notes have to be taken during lectures. The central problem in this course is how to make the students read the course literature or how to organize the lectures in a way to provide the students with the necessary information that can be found in the course literature, without reading it.

2.2.3 Climate: Science and Politics (MIV220/FMIN01)

The course consists of a series of lectures, most of which are given by a diverse array of guests who may be academic experts, practitioners, or representatives of industry or other interest groups. Students are faced with high expectations on their ability to take in and synthesise varied information from a wide collection of sources. These include the standard course literature and the lectures, but also readings that are pre-recommended by lecturers, as well as topical events and news. The complexity of these expectations is mirrored in the layout of the assessment concept, which consists of a collection of elements aiming to detect students who might deploy surface learning strategies, assembled so that they together cover different aspects of the course curriculum – chosen not, however, in order to provide for a time- and resource-wise rational assessment concept. For the course leader, the task of controlling and correcting assessment elements, combined with providing feed-back and following up on partially failing students (who are typically provided opportunities to earn their pass in individual and compensating oral assessment sessions) threatens to become untenably heavy as the number of students is expected to increase. The challenge is to modify or to re-compose the assessment concept so that it allows for increasing student numbers, without compromising the assessor's[3] (i.e. the course leader's) ability to span the taught field in width (in terms of students' familiarity with the variety of topics that it includes) as well as in depth and complexity (in terms of students' capacity for synthesis within and across the topics).

2.2.4 International Physical Distribution (MTT045)

The following are some of the main issues concerning project work at the course:
- Students collectively receive group grades. This form of assessment does not evaluate elements of group activities, individual contribution made by each group member, nor relationships and teamwork skills.

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[3] In Swedish: *examinatorns.*

- Project supervision is expensive (the cost of supervision is ca 12-15 hours/group × 150 SEK/hour), time consuming and labour intensive work. For each group the supervisor reviews and provides both written and oral feedback for several (2-4) report drafts. The course tutor also goes through and assesses all the project reports (ca. 6000 words per group × 10 groups).

- The knowledge, experience and skills of the supervisors may vary. Supervisors are usually students from the Master of Science programme. The condition that a student has passed the course may sometimes be sufficient for a student to be assigned as a supervisor. For many students, this may be the first and the only time acting as a supervisor. Many students may lack skills required in supervision, and research methodology and processes in general. Further, they may not be acquainted with all research topics dealt in project works.

- Inconsistence and lack of harmonisation: Different supervisors may provide different guidelines and feedback to the students.

- Hard to find supervisors at short notice in particular when the course attendance far exceeds the anticipated number of students.

2.2.5 Water (VVR145)

A general problem in all courses is related to surface learning. When reading the comments that students make on the exams it is clear that sometimes a student can solve a particular problem, but they have no idea if the answer is realistic. Clearly they used a surface learning approach and just know how to use a set of equations without understanding their physical meaning. How can the course material and the assessment methods be used as a tool to avoid surface learning? Another problem is related to giving feedback. Individual feedback would be good, but the resources are limited. How can feedback be given after the exams in an effective way?

3. DISCUSSIONS

In the following sections, we start out by organising our discussions about assessment concepts around two vantages. First, we select a set of assessment modes as bases for general and specific reasoning; with references to the corpus of assessment-related literature, as well as to our empirical input and experiences. Second, we take our point of departure in the five courses presented above, giving suggestions for improvements of their respective assessment concepts. In the third section of our discussion, we return to our research question aspiring to synthesise, with an emphasis on selected aspects and issues, the outcomes and suggestions thus far presented.

3.1. Selected assessment modes

Based on our empirical input, as presented in Table 1, we note that the most popular assessment mode by far among teachers (i.e. among those attending the LTH inspirational course in 2007–2008) is some kind of project. Projects are also a form of assessment used in four of the five courses presented in Table 2. Two other assessment modes that tend to be close at hand to LTH teachers when designing courses (again, given the information in the two tables) are conventional written exams and individual oral assessments. In the following parts of our discussion, therefore, we highlight each of these three forms of assessment in turn.

3.1.1 Assessment by project work

Project work is an important component of many courses provided at Lund University. A project can be defined as an activity that is characterised by the following (Eklund, 2002):

- has a goal and solves a *unique problem* (goal-oriented, once-only character)
- has a *temporarily commitment* (fixed delivery datum for the research results)
- has limited resources (foremost with regard to time)
- has a project plan (well defined task, objective, division of labour, delivery terms)
- *follow ups* of the status of the work and reporting
- concludes with the *final project report* (containing reflections and analyses of the project results accomplishments.

The following briefly describes the project processes and the assessment system, mainly focusing on the course of International Physical Distribution (MTT045), Department of Industrial Management and Logistics (IML), Division of Engineering Logistics (T-LOG).

The project is an important element of all selected courses. With project works come many benefits. According to course evaluations carried out at T-LOG as well as LTH levels, the project is one of the most highly appreciated course elements. At T-LOG, the main purpose with the project is to enable students to expend their knowledge in the course subject and gain a deeper understanding in a particular area of interest including relevant concepts, theories and models in the field of international distribution. The project encourages students to work independently as well as in a team, stimulates critical thinking and enhances the ability to describe, analyze, synthesize and design solutions. In addition, the students learn and employ the fundamentals of research methodology and processes and therefore are able to perform similar projects in the future.

The number and the form of organisation of students in groups vary across courses – they vary from one to several students in a group. At T-LOG (course MTT045), due to the combination of the large number of students and the main purpose of the project, the projects are usually carried out in groups of 4-6 students. However, at the Division of Structural Engineering (VBK032), the general view is that students in small groups (2 students) working together have equal ambitions and workload – "the larger the group the higher the probability of free-riders".

At T-LOG (course MTT045) students are free to form their own group, select their own research topics of choice and allocate tasks to individual members of the group. The project is largely based on the combination of library and field studies (e.g. interviews and observations). Students are encouraged to come in contact with relevant actors in the industry and discuss their concerning issues. At the beginning of the course, each group is assigned a supervisor who provides guidelines and feedback throughout the entire process. In other departments/courses (e.g. VBK032), groups largely work independently throughout the project process. However, students are free to come at any time to the course tutor and ask for help with calculations and other project related issues. Furthermore, only the final report is read by the teacher.

Project assessment is an important and integrated component of the examination system in all selected course. To be qualified for a final grade, students must have passed the written examination and completed the compulsory project. Course MTT045 is a course worth 7.5 ECTS-credits. The student has to pass all the obligatory elements in order to pass the course.

The final grade is the weighted grade obtained from the written examination (60%) and project (40%). The attendance at both project presentation and opposition is compulsory. In addition, the students have to meet other obligatory elements of the course, as specified in Table 2.

The key elements of the project, which are assessed based on T-LOG's established assessment criteria, are the written report, oral presentation of the project results and written and oral opposition (i.e. peer assessment) of another project report. The project elements are discussed and assessed in a joint meeting by the course assessor and tutor as well as supervisors assigned to each group. The supervisors are asked to peer assess other project reports than their own. The peer assessment by the opposition group is also discussed, but it has insignificant weight on the overall project grading. The final grades of the projects are determined by the course examiner and tutor.

3.1.2 Conventional written assessments

There are many different kinds of written examination. Variations contain the parameters location, time frame, auxiliary means and content. The most common written examination is taken by students at a certain date in a certain place, all students at the same time. However, the students can also be given some more time (e.g. 2-3 days) to write the exam at home (compare e.g. MIV220/FMIN01). In that way, students can work individually and self-determined during that time frame and have access to unlimited resources (e.g. library, internet, all course material).

Written examinations can be held with or without auxiliary means such as books, calculators, etc. Of course, depending on what the students are allowed to bring with them, different kinds of questions can be posed. When the exam has the character of an open-book exam, much more detailed and more difficult questions can be posed compared to an exam where the students are only allowed paper and pencil. Thus, both divergent and convergent thinking (Biggs 2003) and different cognitive levels (Bloom's taxonomy, Anderson et al. 2001) can be included.

The written exam can be both formative and summative (Biggs 2003), depending on the exams content and its point in time in the course and the feedback provided. However, the big disadvantage of the written exam in comparison with an oral exam is the fact that no deeper (spontaneous) questions can be posed as long as the student can answer to check on the depth of learning.

Written exams can be a very cheap assessment form, if the content of the exam can be easily checked by the teacher, e.g. multiple choice questions or calculations with well-defined input values. However, if the students are to write essays or if the questions have an open-ended format, this can be very difficult to grade and almost all grades can be obtained if exams are graded by different teachers (Biggs 2003).

During the Participants' Seminar described in section 2.1, it was also stressed as advantages that during written exams, cheating is difficult and that questions on the whole course content can be posed. A disadvantage mentioned during the session was that there is a risk that students practise type examples of exam questions (especially in technical courses where they are supposed to do calculations) without really understanding, thus not reaching the application level in Bloom's taxonomy.

3.1.3 Individual oral assessments

Most teachers probably agree that a direct communication is the best method to asses the "real" knowledge of the students. Informal conversation between students and teachers, e.g., after lectures or at tutorials, is rewarding for both parts. The teacher can get information on the level of the knowledge of the student and what specific problems he or she is currently facing. The student can ask questions and get help to understand the course material. The informal conversation is thus a kind of formative process that helps both students and teachers. The problem in large courses is that this informal contact usually is limited to a few students. One way of reaching all students is by individual oral assessments.

Individual oral assessments are used as a resit-examination form in VVR145 and MIV220 (see Table 2) when the number of students is low (<10). Generally the experience of the method is very good in these courses.

There are several myths regarding this assessment method (see section 2.1), both among teachers and students. Teachers generally like the idea of oral assessments but they believe that the time required is considerably higher compared to a written exam. Students are often concerned that an oral assessment is more difficult compared to a written exam. The students are normally much more confident in writing compared to speaking. Larsson (2001) presents a case study of a test of the oral assessment method in one compulsory course within the Environmental Engineering program. In total 28 students were assessed, 14 of them answered a questionnaire after the exam. The questionnaire consisted of six questions concerning the comparison between a written and an oral assessment. Larsson concluded that a majority of the students thought that the oral examination was 1) better, 2) fairer, 3) better for checking the students knowledge, 4) more stressful, 5) a better tool for learning something during the assessment compared to a written exam. Finally a majority of the students recommended that the oral assessment method should be used in the future in this course. The total workload of an oral assessment was also estimated. Larsson concluded that if the number of students is 30, the oral assessment is less time consuming compared to a written exam. If the number of students is 60, the oral assessment takes 25 % more time.

In the light of this study it seems that the oral assessment method should be used considerably more at LTH, especially in courses with a limited number of students.

3.2. Suggestions to improvements in the five LTH courses

In this section, the course teachers each suggest options for the central problems occurring in their own courses.

3.2.1 Industrial Design Project III: Sustainable Development (IDE110)

The assessment of the course could be changed to a different combination of assessment elements. The theoretical part could include literature studies, perhaps made in groups of three reading the same book, afterwards communicating the content in graphical form. The assessment of this part could be made as a seminar where the groups communicate and discuss the content of the books in front of all students. In this way we could create a "common platform of knowledge" to base informed discussions on. The research phase could be done in groups creating a written report accompanied by an oral presentation in front of the group. The writing could be assessed continuously by appointing an "opponent group" to each

group making students assessing each other. The project work could be done individually or in groups representing an area of interest, but with individual projects presented and assessed in the same way as it is being done today, in several critique-seminars (feedback) and in a final presentation supported by 2D- and 3D-visualizations.

3.2.2 Timber Engineering (VBK032)

One possibility to solve the problem of the students not reading the course book is to decrease the amount of information given during the lectures. For example, general information can be given during the lecture, but specific details are not given, but referred to where this specific information can be found. This will make students look up some information in the course book, and hopefully they will also read "around the specified section". Additionally, the teacher should stress that the students need to read the course book in order to be able to answer the questions in the written exam.

Another method would be to change the assessment system, increasing the importance of "theoretical" or background knowledge. This could be done by increasing the percentage of questions relating to theory in the written exam. If more credits can be gained by the knowledge of background and theoretical information, the students will be more willing to read the course book providing this information. Of course, the percentages for theoretical and practical parts in the written exam should be communicated thoroughly in the beginning of the course.

During our Participant's Seminar (see section 2.1), many of the participating teachers recommended to assess the Timber Engineering course by project work. This could also be a solution to the central problem. The importance of the project work could be increased at the expense of the written exam, e.g. to weigh equally much (50% of final grade). Furthermore, the practical part in the exam could be cut, thus increasing the importance of theoretical and background knowledge as well as synthesizing abilities. Thus, to pass the exam, the course book has to be read. If the final exam is to contain mostly theoretical aspects and synthesizing, it could also be held as an oral exam, where new, more detailed questions can be asked as long as the student can answer. In this way, higher levels of learning (Bloom's taxonomy) can be assessed.

To increase the willingness to read and appreciate the course book, this year the students will read other timber engineering course books in groups of 4 students. They are to compare the general course book to another book relating to several parameters. At the end of the course, they have to present the book for their classmates during about 10 minutes. The aim of this is to make them actually read the course book by letting them compare books, but also to find potentially good course literature.

3.2.3 Climate: Science and Politics (MIV220/FMIN01)

A primary course objective is to enable students to take informed positions and make relevant contributions to the discussion on climate change policies and measures on the basis of an understanding of the science of climate change, as well as of the global and national institutional frameworks and mechanisms within which climate issues are addressed and climate policies are adopted. The currently applied assessment concept for the course was designed to (i) check for knowledge and understanding of basic scientific facts (the written test), (ii) check students' capacity for extensive assemblage and individual synthesis of new information (particularly for topics in which they themselves have interests) (the essay

project), (iii) make sure that the width of the field of topics taught is known to students (the minimum attendance rate requirement) and (iv) check for students' understanding of the interlinkages between topics and the complexities of the whole field; and probe also their ability to synthesise information across topics (the home assignment). Students who fail either to pass the written test or to meet attendance requirements may compensate in individual oral exams by special appointment. Already with a small group of students, this assessment concept is rather demanding in terms of the input of time required by the course leader, not least in the project component, which for reasons of supervision and feedback has involved a series of submission dates before as well as after the compulsory project presentation seminar. In course evaluations, students have also commented on the heavy workload, particularly within the essay project element. Anticipating a successively increasing number of course participants in the near future, this component of the assessment concept, therefore, is identified as the part most in need of reform.

Changes to the assessment concept currently considered include:
- Abandoning the essay writing on free topics in favour of a different type of project, where students prepare oral presentations, based on shorter and less formally written papers, which are to expound on (largely but not necessarily entirely) pre-defined topics that are either assigned to students or chosen by them from a set list. Topics should include required readings, as well as a requirement to complement the material with self-sought references (and/or empirical data). If need be, provisions can also be made for presentations to be made by pairs or small groups of students, while still requiring them to prepare their papers individually. The course leader's own assessment of the quality of papers may be complemented with, and therefore facilitated by, a peer assessment routine according to a set template. This reformed project concept would require more preparatory work by the course leader, but it would substantially reduce the workload connected with supervising and correcting essays.
- Abandoning the minimum attendance requirement, and integrating, somehow, the spanning of the entire field of topics taught in the inclusion of control questions in the home assignment instead. Informing students, at the beginning of the course, that the selection of such control questions may vary across the population of students, and that they are likely to be individually selected to include topics that were covered when students were absent would, hopefully, be an incentive for students to compensate for any absence by increased directed self-studies. (So far this has been checked for in individual oral exams.) The proposed reform may or may not prove to ease the course leader's work load. The outcome, which depends on whether or not the failure rate for home assignments increases as a consequence of the reform, would therefore have to be evaluated.

3.2.4 International Physical Distribution (MTT045)

In connection with issues concerning project work process and assessment at International Physical Distribution, which are presented in section 2.2.4, the following are some suggestions for improvements:
- In order to improve the effectiveness and efficiency and harmonize the processes, the assessment criteria should be made available on the department's website. At the beginning of the project, students and supervisors should be advised to consult and employ the criteria in writing the report, presentation and opposition or peer assessment.
- It has been hard to find supervisors at a short notice. Therefore, it is important to establish a database containing information on persons who are willing to act as a supervisor. The in-

house personnel (PhD students and faculty staff) can also act as supervisors in "emergency" cases.

- Enhance the status of the project work by:
  - Integrating the project process and assessment into the overall course curriculum and assessment.
  - Making sure that the students are also assessed individually on their project performance.
  - Encouraging students to perform project works that are closely related to the real world.

3.2.5 Water (VVR145)

One possible solution to avoid surface learning will be tested the next time the course is given. An extra assignment will be introduced. In this assignment the students should write a short (1-2 pages) essay. In the essay the students should show that they have attained the course goals by applying their knowledge to a real world problem. The topic can be anything related to the course material. The students can chose the topics themselves, but an archive of newspaper articles will also be available to the students. The students should explain how the facts found in the articles relate to the course material.

By this essay the students are forced to use their knowledge in a new way and not just solving standard questions at the exams.

In order to avoid extra work for the teacher, the students should read and give comments to two other essays. The essays should be marked (0-2), these marks should be added to the results of the exams.

A feedback seminar will be given after each written exam. The seminar should be given after all exams have been corrected but before the results are available to the students. During the seminar the correct solutions to the problems should be given, typical errors made by the students should be commented and questions should be answered. In order to encourage the students to come to the seminar, one extra mark should be added to the result of the exam. Using these seminars the students should hopefully feel that the exams are not just a test of their knowledge but also a way to learn something.

3.3. Syntheses around aspects and issues raised

As can be seen above, there are numerous problems identified in the courses described. However, all problems can be overcome, or at least minimized, by clever course management. There is, however, also a risk of "over management" leaving little room for the students to do anything outside the small outlined path through the course curriculum. Studies have shown that a formative assessment approach helps student learning (Ellervik, 2006; Roediger and Karpicke, 2006). However, a study at LTH has also shown that too many assessment elements in a course can be stressful for the students, forcing them into a surface learning approach or even to quit the course entirely (Lindberg-Sand and Olsson, 2008). Thus, care has to be taken when planning and coordinating courses so that the total workload is reasonable.

The number of assessment methods and their variation is endless. Some students work better in groups, some like written exams, some express themselves better orally and so on. A variation of assessment methods along the way to graduation is recommended. Course coordination is the key word here.

The focus of the assessment method should be to encourage deep learning, pushing the students higher on the Bloom taxonomy scale. A formative assessment with constructive feedback should be preferred over a summative approach, but the teaching resources are the limiting factor, especially in larger courses. Various types of group feedback in seminar form could be a solution.

4. CONCLUSIONS

This report dealt with the central issues concerning the formal assessments at LTH. Many courses are provided at LTH covering a wide rage of subjects. Courses are generally assessed based on the faculty standards, guidelines and practices. With reference to the main purpose of the study, this report critically examined and discussed the assessment concepts, focusing in particular on some main issues as presented in section 2.2. The study was primarily confined to the main forms of assessment (i.e. project assessment, written examination and oral assessment) within five selected courses. In addition, the results of two surveys and discussions of participating teachers on the topic of student assessment were also synthesised and integrated in this report.

The assessment forms share both relative advantages and disadvantages. Many teachers agree that direct communication is a good method for assessing the knowledge of the students. The course tutors generally like the application of oral assessments. However, they believe that the oral examination is a more time intensive activity than the written examination. Students often consider the oral assessment more difficult than the written examination. According to a study, the oral assessment takes more time than the written examination when the number of students is 60, but it takes less time when this number is less than 30 students. Individual oral assessments are used as a re-sit examination form in two selected courses (i.e. VVR145 and MIV220) when the number of students is small.

The results of surveys and discussions showed that the participating teachers (22) were more positive to project assessment and written examination than oral assessment. The results of data analysis showed that, in all five selected courses, the course tutors have, to various extents, combined different assessment concepts into a holistic approach. Project assessment is considered a very important element. It is the most commonly used form of assessment in four of five selected courses. According to numerous surveys, project is one of the most appreciated elements of many courses provided at LTH.

Based on the results of the study and teaching experiences of the authors of this report, recommendations for improving assessment forms are also provided. In order to enhance the quality of teaching/learning, the course tutors should employ the most suitable combination of assessment concepts for a particular course. In addition, appropriate adjustments for particular situations should also be made accordingly. For some courses, project assessment and written examination may be a good combination of assessment.

In conclusion it is not meaningful to make any general recommendations other than that the assessment method in a course needs special attention when planning courses. The assessment method should be selected with just as much care as, for example, the course literature. It can be very useful to combine assessment elements into a holistic assessment concept.

References

Anderson, L.W. et al. 2001. A Taxonomy for Learning, Teaching, and Assessing — A Revision of Bloom's Taxonomy of Educational Objectives. Addison Wesley Longman, Inc. 2001.

Biggs, J. 2003: Teaching for Quality Learning at University. Second Edition. The Society for Research into Higher Education & Open University Press.

Bloom, B.S. 1965. Taxonomy of educational objectives: the classification of educational goals. New York : Longmans, Green.

Cizek, G.J. 2002. When Teachers Cheat. Streamlined Seminar, Vol. 21 (2002–2003), Issue 1–2.

Dahlgren, L-O. and A. Fejes 2005. ECTS-skalan. Att mäta eller mota lärande? Pedagogisk forskning i Sverige. Årg 10. Nr 1.

Eklund S. 2002. Arbeta i projekt - en introduktion, Lund, Studentlitteratur.

Ellervik, U. 2006. Morot och piska. Aktionsforskning kring kontinuerlig examination, LTH:s Inspirationskonferens 2006.

Gibbs, G., and C. Simpson. 2005. Conditions under which assessment supports students' learning. Learning and Teaching in Higher Education. No 1, 2004-05.

HEO [Higher Education Ordinance] 1993. Högskoleförordningen SFS 1993:100. Swedish Parliament.

Larsson, R. 2001. Muntlig tentamen, redovisning av ett forsök och jämförelse med skriftlig tentamen. Unpublished manuscript.

Lejk, M., et al. 1996. A Survey of Methods of Deriving Individual grades from Group Assessments. Assessment and evaluation in Higher Education, Vol 21, No 3.

Lindberg-Sand, Å., and T. Olsson. 2008. Sustainable Assessment? Critical Features of the Assessment Process in a Modularised Engineering Programme. In Paul Trowler (ed.): A Socio-Cultural Approach to Teaching, Learning and Assessment.

Roediger, H.L. and J.D. Karpicke 2006. The power of testing memory: Basic research and implications for educational practice. Perspectives on Psychological Science, Vol. 1, No. 3, 2006, 181-210.

Rust, C. 2002. The impact of assessment on student learning. Active learning in Higher Education, Vol 3, p 145-158.

Appendix 1: Literature list for Participants' Seminar

☺ Alschuler, Alfred S. & Gregory S. Blimling (1995) *Curbing epidemic cheating through systemic change.* College Teaching, Vol. 43, Issue 4.

☺ Ashworth, Peter, & Philip Bannister (1997) *Guilty in whose eyes? University students' perceptions of cheating and plagiarism in academic work and assessment.* Studies in Higher Education, Vol. 22, Issue 2

☺ Axelsson, Anna (2005) *Kan man lita på kamratsgranskning?* LTH:s Inspirationskonferens 2005.

☺ Barrett, Ruth, & Anna L. Cox (2005) *'At least they're learing something': the hazy line between collaboration and collusion.* Assessment & Evaluation in Higher Education, Vol. 30, No. 2

☹ Brorsson, Mats (2000) *Kamratgranskning. Några erfarenheter från en kurs i Datorsystemteknik.* UPC-bladet Nr 2

☺ Biggs, John (2003) *Teaching for Quality Learning at University.* Second Edition. Maidenhead, UK: Open University Press.

☺ Carroll, Jude (2000) *Plagiarism: is there a virtual solution?* Teaching News (November)

☺ Cervin, Anton, Charlotta Johnsson, Anders Robertsson (2006) *Återkoppling som en del i lärandeprocessen.* LTH:s Inspirationskonferens 2006

☺ Cizek, Gregory J. (2002) *When Teachers Cheat.* Streamlined Seminar, Vol. 21 (2002–2003), Issue 1–2

☹ Dahlgren, L-O. & Fejes, A. (2005) *ECTS-skalan. Att mäta eller mota lärande?* Pedagogisk forskning i Sverige. Årg 10. Nr 1

☹ Dochy, F. mfl, (1999) *The Use of Self-, Peer and Co-assessment in Higher Education: a review,* Studies in Higher Education, Vol 24, No 3

☺ Ellervik, Ulf (2006) *Morot och Piska – aktionsforskning kring kontinuerlig examination,* LTH:s Inspirationskonferens 2006.

☺ Gibbs, G. & Claire Simpson (2005) *Conditions Under Which Assessment Supports Students' Learning.* Learning and Teaching in Higher Education. No 1 2004-05

☺ *Högskoleförordningen* (SFS 1993:100)

☺ Lejk, M., mfl. (1996) *A Survey of Methods of Deriving Individual grades from Group Assessments.* Assessment and evaluation in Higher Education, Vol 21, No 3

☺ Lindberg-Sand, Åsa & Thomas Olsson (In press) *Sustainable Assessment? Critical Features of the Assessment Process in a Modularised Engineering Programme.* In Trowler, Paul (Ed.) A Socio Cultural Approach to Teaching, Learning and Assessment.

☺ Nicol, D. & Debra Macfarlane-Dick (2006) *Formative assessment and self-regulated learning: a model and seven principles of good feedback practice.* Studies in Higher Education. Vol 31, No 2

☺ O'Donovan, Barry, Chris Rust, Margaret Price, and Jude Caroll (2005)"*Staying the Distance": The Unfolding Story of Discovery and Development through Long-Term Collaborative Research into Assessment,* Herdsa News, April 2005

☺ Pecorari, Diane (2003) *Good and original: Plagiarism and patchwriting in academic second-language writing.* Journal of Second Language Writing, Vol 12

☺ Pennycook, Alastair (1996) *Borrowing Others' Words: Text, Ownership, Memory, and Plagiarism.* TESOL Quarterly, Vol. 30, No. 2

☺ Rust, Chris, (2002) *The impact of assessment on student learning,* Active Learning in Higher Education, Vol 3, 145 – 158

☺ Rust, C. (2001) *A Briefing on Assessment of Large Groups.* Learning and Teaching Support Network. Generic Centre

Appendix 2: Group work instructions during Participants' Seminar

You are part of a teacher team and shall provide an assessment concept for a new course, Timber Engineering. The course description with its learning outcomes is given below (in Swedish).

Träbyggnadsteknik VT2010

Träbyggnadsteknik är en valfri kurs som ges i årskurs 4 för väg- och vattenbyggnads-programmet. Kursen ges under läsperiod 2 på vårterminen, är på 6 ECTS-poäng och har c:a 30 deltagare.

Kursen ska ge fördjupade kunskaper om funktionssätt, dimensionering och utformning av konstruktionselement i trä samt förband i träkonstruktioner. I kursen behandlas också byggsystem för hallbyggnader, småhus, flervåningshus-, bostads- och kontorshus med trä som primärt stommaterial, samt träbroar.

Efter genomgången kurs skall du
- Ha god kunskap om hur trä, limträ och skivmaterial fungerar som konstruktionsmaterial
- Kunna dimensionera träkonstruktioner i brottgränstillstånd med avseende på
  - böjning
  - skjuvning
  - vippning
  - knäckning
- Kunna dimensionera träkonstruktioner i bruksgränstillståndet
- Förstå funktionssättet hos både raka och krökta element i brottgränstillståndet
- Kunna dimensionera sammansatta konstruktioner
- Förstå begreppet skivverkan
- Kunna bestämma bärförmåga hos olika typer av förband i träkonstruktioner
- Ha kunskap om olika typer av detaljutformningar som kan vara aktuella i träkonstruktioner