

# Can Lecture Slides Replace a Course Book?

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**Abstract**—This paper considers the effects of using lecture slides, not as a supplement, but as a replacement for a course book. The learning aspect is discussed in relation to surface and deep approaches to learning. The students' view of this is evaluated by means of a survey given to all students taking the Web Security course 2009 at the faculty of engineering at Lund University. Most students did not have a problem being without a course book, and in fact, many were very positive about it. However, from a learning point of view, it is argued that it might encourage a surface approach to learning.

## I. INTRODUCTION

The lecture is the most common teaching form in universities. A common use of the lecture is to give an overview of the main topics but also to make sense of the topics covered by a course book. The students are supposed to supplement the lecture with reading the course book. However, some courses may not have a course book. In this paper we look at the situation where there is no course book to relate to. Instead the course material is given by lecture slides. This material is also supplemented by links to document with the purpose of clarifying the sometimes too dense information given on the lecture slides. There has been a large number of studies on the use of lecture slides during the lecture, see [8] and the references in that paper. In this paper the focus is not mainly on the use of lecture slides *during* a lecture, but instead on how the material on the slides can be *used as course material*.

## II. LECTURE SLIDES AS INFORMATION MEDIA

In 1964, McLuhan [6] argued that information is included in the message medium, not just in the contents of the message. Later it was argued that specific attributes of media can be used to develop unique cognitive processes [7]. Clark [2], [3] claimed that from an educational perspective it is only the content that affects the receivers. Media are “mere vehicles that deliver instruction but do not influence student achievement...”. There is a sharp contrast between books and lecture slides. They can be regarded as two extremes in how the information is transmitted. While a book uses tens of thousands of words the lecture slides aims to present the same material using as few words as possible. Anything that can be put on a slide can also be included in a book, and with that background it could be easy to say that books are always better, or just as good. However, lecture slides have a few other properties that are advantageous.

- The students can cover more material in the same amount of time by focusing on what is important.

- It is easier to get a quick overview of the material that is included in the course. This may help the students organize their studies better.
- The information on lecture slides can easily be kept up-to-date, while a book has to be released in a new edition in order to incorporate changes.

A textbook has the purpose of explaining the material on a detailed level, but also to introduce the subject on an easier level. Mathematical proofs and detailed examples are more suitable for the book format.

On the other hand, when choosing the textbook, it is desirable that it takes the same approach as the teacher has planned for the course. Otherwise some students might get confused and waste energy by trying to figure out how the lectures relate to the book. This is less of a problem if the book is authored by the teacher, even though this also has some drawbacks as the teacher often financially benefits from this [4].

In [5], characteristics of deep, surface and strategic approaches to learning are given. One characteristic of a surface approach is that the student “tend to stick closely to the course requirements”, while one characteristic of a deep approach is that the student “tend to read and study beyond the course requirements”. By concentrating course material to lecture slides, the surface approach is clearly encouraged.

## III. BACKGROUND TO SURVEY

The course Web Security is a compulsory course in the Information and Communication Engineering Technologies program at LTH. In addition to these students, there are several students from the Computer Science and Engineering program that attend the course. In all, the course has between 40 and 50 participants each year. The course is relatively small, 4 credits, and consists of seven lectures and one project. Apart from the seven lectures, the only other scheduled meeting with students is when they present the project. There are no seminars or problem solving sessions. The examination consists of an ordinary exam with 14 questions.

As computer security, and in particular security related to the web, is a constantly evolving subject it is difficult to find a course book that is sufficiently up-to-date. Moreover, a course book would have to cover all, or at least a vast majority of, the subjects discussed during the course. No such book has yet been found, and since the course content is regarded by the course teachers as the currently most relevant topics, it has been decided not to use a book in the course. Instead, the material included in the course is covered by lecture

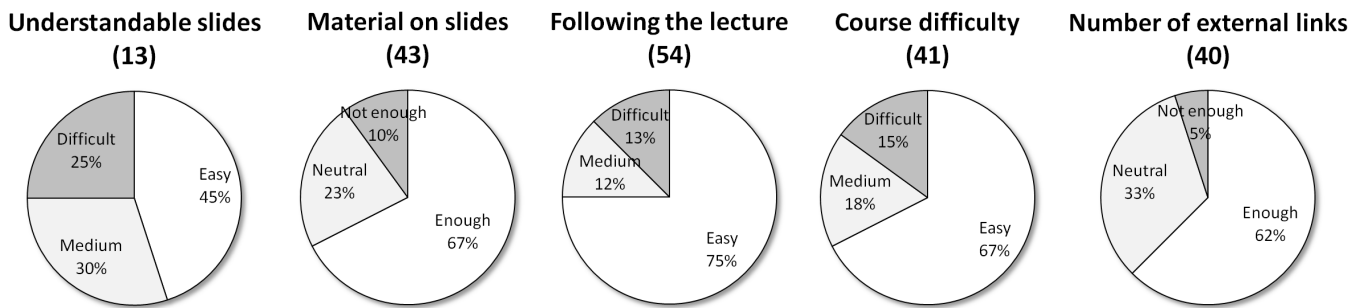


Fig. 1. The result of the survey. The answers corresponding to 50 and 100 points and the answers corresponding to -50 and -100 points have been grouped together.

slides. In addition, external links to relevant information is given on the course web page. This can be e.g., academic publications, standards documents, and in some cases even news articles. This guarantees that the information is never old, but it also makes it important to clearly state which parts of the documents are included in the course, and which parts are not. Indeed, some standards documents tend to be very extensive. Here it should be noted that the number of external links was kept to a minimum and their main purpose was to clarify the information in case some parts were not clear from the lecture.

#### IV. THE SURVEY

To somewhat compensate the lack of a course book, the lecture slides contained a relatively large amount of information. This is not the optimal way to use lecture slides [1], but is more or less necessary in this case.

The purpose of the survey was to evaluate the students' perception of the course material. They were given a set of five statements.

- 1) The lecture slides were easy to understand without additionally consulting other sources.
- 2) The lecture slides contained enough material and a course book is not necessary.
- 3) Despite the amount of information on the lecture slides, it was easy to follow the lecture.
- 4) I got the impression that the course became easier by the fact that all information that I had to know for the exam was given on the lecture slides.
- 5) There was a sufficient number of external links on the web page.

To minimize any bias induced by the statement, the statements were also given in an opposite way. As an example, the second statement was also given as "The lecture slides did not contain enough material and I believe that a course book is needed". The exact set of statements given to a student was randomized. As the result showed no significant difference between the statements, the statements given above will be used when the result is presented.

The answers were given by a 5-graded scale, similar to the one used by the CEQ questionnaire at LTH. Also, as used in CEQ, the points -100, -50, 0, 50, and 100 were used to

represent a scale from "fully disagree" (-100), up to "fully agree" (100).

In addition to the statements, the students also had the possibility to propose changes to the course material in an open-ended question.

#### V. RESULTS

The result of the survey is given in Figure 1. To simplify the presentation both positive answers and both negative answers have been grouped together. This somewhat lowers the resolution, but follows the style used in CEQ, and is in part compensated by giving the mean score for each statement in parentheses.

#### VI. DISCUSSION

The first three statements are focused on the actual information given on the slides, and are used as an indicator if they should be clarified or not. While most students were satisfied, it is clear that they could be made more understandable in the future. The results provide a simple way of allowing the course to be improved in the future. The result of the third statement is somewhat surprising. The lectures were easy to follow despite slides containing quite much text. The last two statements focus on the issue of only using slides and some external links, and no course book. The result here is more interesting. It is evident that most students had the impression that the course became easier with only lecture slides, than it would be if there had been a course book. A possible interpretation of this is that these students take a surface approach to learning. While a course book would enable a straight forward possibility for a deep approach to learning, the lack of a course book makes it easier to focus only on the things that may be tested on the exam. The surface approach is also supported by the result of the second statement. Most students thought that there was enough material on the slides. This is certainly true if you just want enough information to pass the exam.

In addition it should be noted that a deep approach would still be possible as the links given on the course webpage provided more in-depth information about the material. One student commented that he/she preferred finding the information on his/her own, using the lecture slides (and Google) as a starting point. Despite the restrictive set of external links, most students thought that no more links were needed. This

also supports the theory that a surface approach was used by most students.

## VII. CONCLUSION

A study was performed to evaluate the students' impressions on the fact that the course Web Security does not use a course book. Instead, all course material is given on lecture slides together with links to e.g., standards documents. This not only enables, but also simplifies, a surface approach to learning and can thus be considered suboptimal in a university environment. At the same time, many students take this approach to learning, and are thus happy with this arrangement. It can be noted that the project, which is mandatory in the course, stimulates a deep approach to learning. Several students took this opportunity and performed a very good project result. However, since it is not graded many students also tended to do only what was necessary to pass, a characteristic of the surface approach to learning. Finally, to answer the question posed by the title: Not from a learning perspective according to contemporary research, but possibly from a student perspective according to the results of the survey conducted in this paper.

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