RECENT DISSERTATIONS

ÅSA RYEGÅRD (2004):

Interaction Between Practical and Theoretical Knowledge - A Study in Electronics Education at University Level

Department of Electronics, Mälardalen University, Sweden

Licentiate thesis No.37

Abstract

Scores on standardized tests in the field of electronics is below average compared to other fields, indicating a need for improved education methodologies. This licentiate thesis presents the results of a teaching method called “Interactive Teaching” which exposes the student to practical aspects of electronics at the same time as student is learning the theory.

Within the scope of “Interactive Teaching” strategy, each lecture is followed by an interactive exercise. In this exercise the students verify theories with practical work and discuss the results in smaller groups. The practical verification of theoretical learning is intended to strengthen the interaction between theory and practice and to make students actively find answers to their own questions. “Interactive Teaching” also obliges the students to continuously demonstrate their practical and theoretical learning. The aim is to motivate the students to follow the course and to influence the students learning strategy. The course is finished with an interactive exam, which contains both theoretical and practical problem solving in order to influence the students learning strategy even more. In addition, each student receives a kit with all the equipment necessary for the laboratory exercises. The kit can be used both at home and at school. The purpose of the kit is to make the practical work more easily available and to encourage practical work and experimental work procedures.

Interactive and traditional teaching methodologies, as described in the thesis, were compared in a study comprising 110 engineering students. The study was implemented by a randomized controlled trial called “pretest – posttest control group design”. To make the study as complete as possible, the experimental design was complemented with an attitude test, a formative assessment and an examination assessment.

It was shown that interactive teaching, with its verification of theoretical concepts with practical examples, did strengthen the student’s capability to solve problems in electronics. Also, the open framing of questions encouraged the students to find answers to their own questions. Interactively taught students were just as good in theoretical knowledge and better in practical knowledge compared to their traditionally taught peers. Interactively taught students increased their self-confidence when solving problems. They also increased the time they spent on studies as well as that they used their electronic knowledge outside the university. 70% of the interactively taught students passed the final exam versus only 60% of the traditionally taught students, thus they understood the course objective in larger extent.

The positive student response and the increased examination scores show that interactive teaching is an improvement in relation to traditional teaching methodologies. The interactive teaching method most likely influenced the students’ study methods. The licentiate thesis presents a domain specific hypothesis.

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Contact: *asa.ryegard@mdh.se*