

LEARNING COMPUTER NETWORKS IN AN INTERNATIONALLY DISTRIBUTED PROJECT-BASED COURSE

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Abstract - Students' learning of computer networks has been studied in a project-based course, where master level students in computer science study and work in teams of six. Three of the team members are in Sweden while three are in the US. Together these students are taking a course that is jointly taught by two universities. Results are presented concerning the students' perception of the object of their studies: the production of a software system or/and to learn computer science, as well as their experience of collaborating and taking decisions in distributed team, of being graded, etc. Conclusions are drawn as to the relationship between the study environment and the learning outcome and factors that promote good learning are identified.

Index Terms - Computer networks, computer science education, distributed courses, learning environment, teaching methods

STUDYING THE LEARNING ENVIRONMENT

This paper outlines results from an on-going research project into how advanced university students, taking part in an internationally distributed, computer-supported, project-based university course, learn about computer communication. The different ways in which some computer network concepts are understood within the student cohort are discerned and described. These results concerning how the students understand the object of their learning are then related to the students' learning environment, including issues like the collaboration within the group, the use of ICT tools, the roles of the teachers etc. The focus is on the learning environment as it is perceived by the students, since in order to improve learning changes made in a course must be experienced as useful by the course participants.

The empirical data stems from a virtual project course and has been collected at both the Swedish and American universities [3]. The students collaborate in teams over Internet using a range of internet work tools. The task given to the student teams is to construct a software system that controls a computerized, motorized, wooden tool.

The interplay between the students learning of the subject matter and the rather complex environment, in which

their studies takes place, is considered to play an important role in their learning. Attention within the research project is thus paid not only to the different ways in which the students understand computer networks concepts ([1], [2]), but also to the ways in which students experience their learning environment.

A research approach, or research methodology, serves as the lens through which the researcher studies some aspects of the learning, while other aspects becomes blurred or even invisible. The students' learning and perceptions of their learning environment are studied in a qualitative, phenomenographic research tradition [5], illuminated by elements of activity theory [4]. By studying the learning of the subject matter, the learning environment, and the complex relationship between the two, as they are experienced by the students, insights are gained that can help to improve learning environments and thereby learning outcomes.

Insights in the on-going research and preliminary results on the relation between the students' understanding of the subject matter and the learning environment will be presented. The use of a meaningful variation as a tool to enhance learning will be in focus. How different factors in the learning environment promote, or discourage variation and thereby good learning will be discussed. Finally, some recommendations and guidelines for the design of distributed courses will be made.

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