PROJECT ASSESSMENT AS AN INTEGRATED PART OF THE LEARNING PROCESS IN THE PROBLEM-BASED AND PROJECT-ORIENTED STUDY AT AALBORG UNIVERSITY

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Abstract

A constructivist model of project assessment was developed with the aim to further develop the student centred approach in the problem-based and project-oriented study at Aalborg University. The model is based on Niklas Luhmann's operative constructivism and Donnald Schön's idea of reciprocal reflection – in – action, as a way of educating the reflective practitioner. The basic idea is that students learn by way of asking good questions to their own learning processes, rather than by answering questions that are asked by the supervisor. The role of the supervisor is to be a reflective communication partner to the students. The model has been used in five project assessments within the engineering study programme at Aalborg University. It seems to improve both the students' reflections on their learning processes in general, as well as their understanding of the coherence in specific elements in their project. It has also proved to be rather time consuming and should therefor be accounted for in the planning of the curriculum.

Introduction

In this paper, the PBL model of the problem-based and project-oriented study used at Aalborg University is developed using the theory of Niklas Luhmann about operative constructivism [Rasmussen 1997] [Rasmussen 1998] and Schön's theory of reciprocal reflection - in - action [Schön 1987]. During a problem-based and project-oriented study, the students are encouraged to consider their learning objectives, in order to ensure that they fulfil the objectives of the study plan. At the same time, due to the nature of a problem-based project, they are not aware of in advance, which theories and methods they are going to use and learn about later on in the project period. An often-used solution to this problem is that the supervisor informs the students of what to do and how to solve the problem with which they are currently working. According

to the theory of operative constructivism this strategy is not appropriate. Instead the supervisor should teach the students to ask the right question to their own learning process and thereby teach them how to learn through a problem-based project. When following this strategy, it forces us to reconsider methods of planning and conducting the assessment. This paper will describe and discuss such an assessment method.

Method

This paper is based on a three semester's case study carried out as part of a Ph.D. study. Participatory Action Research (PAR) was used to develop a coherent model for supervision and assessment in the problem-based and project-oriented study at Aalborg University [Greenwood et al. 1998]. During three projects with a duration of 4 to 5 months, I was supervising the same group of students[1]. According to the paradigm of PAR, I was to solve the task of supervising the students successfully at the same time as I, as a researcher, had to understand the ongoing learning process in order to develop a model for supervision and assessment.

Theory

According to Luhmann's theory of operative constructivism, a student can be regarded as an autopoietic system who learn by constructing still more complex understandings of his surroundings. By increasing the "system" complexity the student reduce the complexity of the surroundings [Rasmussen 1997]. One result of this theory is that the supervisor cannot teach by providing the students with the correct knowledge. Instead the supervisor can try to perturb the students' understanding through reflective questions. The students are then obliged to chose a new understanding reducing the complexity caused by the supervisor's questions.

Schön's conception of *reciprocal reflection - in - action* describes a way of implementing a reflective communication between the supervisor and the students, which is in accordance with Luhmann's theory [Schön 1987]. See figure 1. The supervisor has to participate in a reciprocal reflection - in - action by changing between roles. The roles are the expert, who knows what to do, and who also demonstrates a good example, and the facilitator, who initiates a reflective dialogue of similarities and differences between his examples and the students' problems. The supervisor should encourage the students to imitate his problemsolving method onto their own problems. It is important that it is not a blind imitation, but an imitation supported by a reflective dialog focusing on the uniqueness of each example. The students' way of imitating the supervisor's examples is an important backtalk to the supervisor about their overall understanding.

[1] The group consisted of 5-7 students with no more than 2 new students each semester.

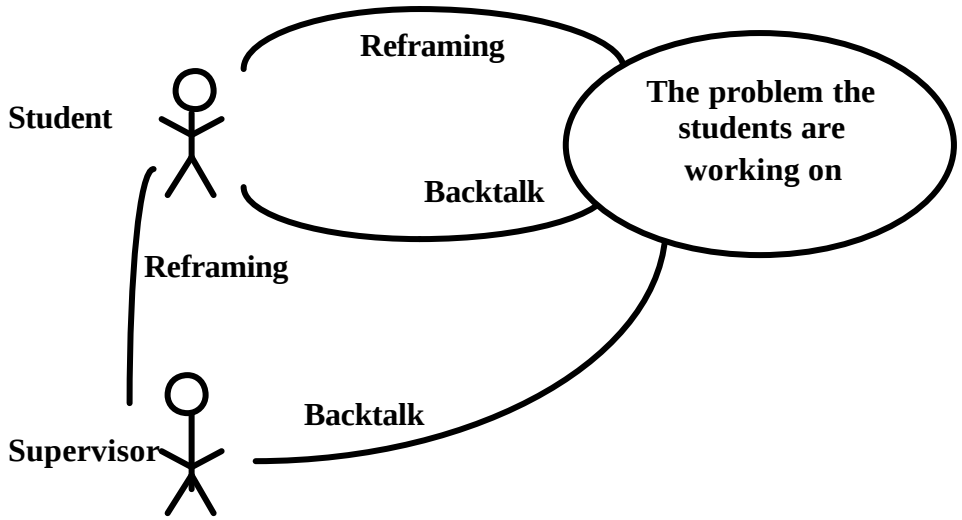

Figure 1. Reciprocal reflection – in - action describes a reflective communication between the supervisor and the students. The students are reflecting - in - action then they shifts between reframing their current understanding of the problem they are working on and listening to the problems backtalk. The supervisor is reflecting - in - action when he takes the students problemsolving as his own problem. Reframing and backtalk means trying to understand the students learning process by initiating and maintaining a reflective dialog.

A new model for assessing problem-based study projects

A major issue of the communication between the supervisor and the students is the learning objectives to be reached at the end of the project period. As a help to the ongoing discussion about learning objectives, a dynamic document describing the learning objectives has been used. During the project, the project group documents its learning objectives, in order to sustain the reflections of links between project activities and learning objectives. See figure 2.

One consequence of using the theory of operative constructivism is that the project assessment should be based on what may be called a kind of self-assessment through a dialogue with the assessors. This dialogue takes its departure in the final version of the written learning objectives. Such a document is called a written evaluation outline.

The students prepare the written evaluation outline after submitting their project report. It contains a description of learning objectives and reflections of, how the learning objectives have been reached by working on the project. Furthermore, the students should include questions, which they find most important to discuss, in order to bring their learning further.

Firstly, the assessors read the document and thereafter they add questions, which they may find appropriate in order to discuss weak parts of the report. All questions are

known both by students and by assessors before the assessment. This enable both parties to prepare for a discussion at the assessment similar to the discussions carried out throughout the semester, as a result of participating in a dialogue based on reciprocal reflection - in - action.

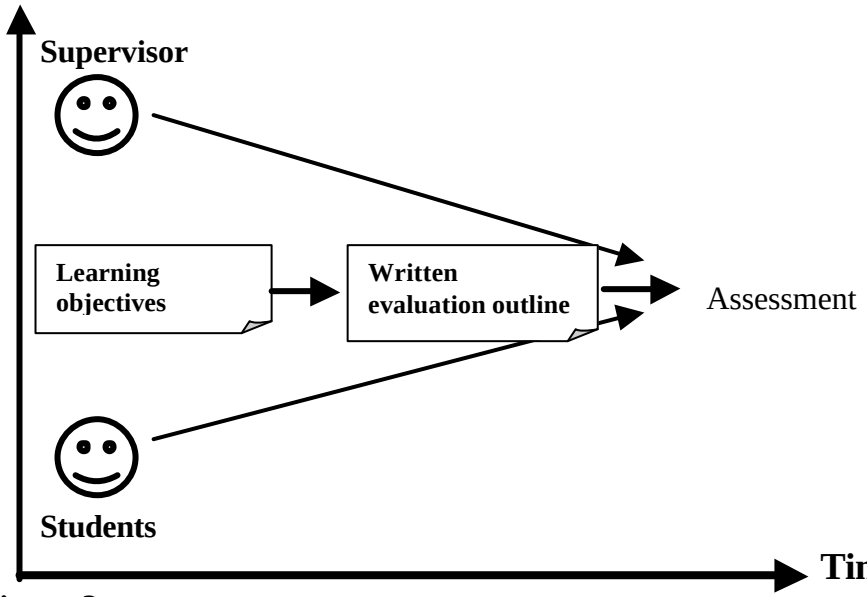

Figure 2. In the beginning of a project, the supervisor and the students have very different understandings of the learning objectives. As a consequence of a successfully reciprocal reflection - in - action, their mutual understanding should convert into a common understanding. As a help to maintain a reflective communication about means and ends, a document describing the learning objectives has been used, and at the end of the period, this has been used as a written evaluation outline.

Discussion

The above mentioned model was used for five assessments for study groups at 1st and 2nd year of the engineering education programme at Aalborg University. From the case study it was found that the students learned to focus on the exemplarity of their project though the discussions about learning objectives. This made them more aware about their own learning process and is an important part of a study centred education system where focus is on teaching students how to learn and how to plan their own study.

Another finding was that the students became more aware about, how they functioned as a group. The reflective dialogue proved itself, then it focused upon issues, such as group dynamics, communication patterns, and organisation and project management.

Finally, another finding from the case study is that working with learning objectives and the preparation of a written evaluation outline are time-consuming activities. If the students are to benefit form such activities, they should be included in the curriculum, and time should be allocated, in order to make it possible for the students to prepare them.

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Curriculum vitae

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