

THE ROLE OF THE TUTOR IN PROJECT-LED EDUCATION: THE DEVELOPMENT OF AN EVALUATION INSTRUMENT

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Abstract — *Project-led education as implemented at a number of engineering courses of the University of Minho requires an approach to learning in which part of the teaching staff is not mainly teaching, but act as facilitators of learning. While tutoring groups of students working on a project, tutors try to guide students towards a working solution, also paying attention to the acquisition of specific technical and non-technical competencies meanwhile. The differences between the role of a teacher and that of a tutor may create some ambiguity both for students as well as teachers. A study on the evaluation of teachers acting as tutors was carried out in de second semester of the academic year 2006/2007 to identify expectations and opinions of students towards their tutors. Knowledge on project-led education, attitudes towards groups, progress of the project, development of critical thinking, group functioning, individual learning and assessment were topics included in the evaluation.*

Index Terms — *Bologna, Evaluation, Project-led education, Tutor.*

INTRODUCTION

Preparing students for lifelong learning and as such enabling them to acquire competencies aimed at learning to learn is nowadays an important feature of higher education. The demands of the Bologna declaration served as a strong motive for many institutions of higher education to implement project work in engineering courses. Active learning, lifelong learning and the preparation of students for a knowledge society have become key features of higher education. Project-led education is regarded a response to the new requirements for future engineers. In this approach, traditional subjects and classes are replaced by a project that incorporates the competencies defined for a certain part of the curriculum of a course. Student-centred learning and assessment are used to promote involvement and responsibility of students. The learning process of the student is the main focus, instead of the teaching process of the lecturer. Students work in teams to solve realistic, relevant problems that are related to their future professional practice. Competencies related to different areas are integrated into one project and in that way integration of different curricular areas is accomplished. Both technical, as

well as non-technical competencies like e.g. time management, leadership, oral and written communication, conflict management, project skills and information processing are developed during the project.

Project work is used to emphasise learning instead of teaching [1]. Project-led education, or project-based learning, has recently been implemented in a number of engineering courses during the curriculum reform process that translated the Bologna demands into a new educational paradigm. At the University of Minho, most engineering courses now have a project component in their curriculum, or use a project approach in one or more semesters of the curriculum. Although the scope and dimension of the projects varies among the different courses, the project is regarded a central element of the curriculum, in which the students acquire technical as well as non technical competencies [2].

In project-led education, the teacher is no longer a lecturer, but is regarded as facilitator of learning. A teacher can have a subject related role or can be a tutor of a team of students. The latter role is non-existing in traditional, teacher-centred education and is therefore new to many teachers. Instead of a transmission oriented role in which the teacher focuses on his or her own actions, a syllabus, books and exercises, the teacher adopts a interaction-oriented perspective, in which the perceptions of students and their actions are central elements [3].

In this context, a distinction has to be made between project-led education and alike project approaches on the one hand and problem-based learning (PBL) on the other hand. In PBL, the tutor supports students in the problem solving process which is primarily aimed at understanding phenomena, deciding on learning goals and working individually on these goals [4]. In project-led education, the tutor supports a team of students who seek to find a working solution for an interdisciplinary problem.

POSSIBLE ROLES OF A TUTOR

Powell and Weenk [5] suggest a number of tutor roles that are to be considered in project work. They start with the tutor as setter of the exercise. Determining the form and content of the project would in this case be a role of the tutor. A tutor can also be the stimulator of the students by showing interest, asking about the why and how of the

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was to uncover perceptions of students concerning the roles of the tutor and also evaluating current tutor performance. It was developed at the Council of Engineering courses and aimed at all different project experiences taking place at the different courses, taking into account the possible different nature of the role of the tutor in a project experience.

INSTRUMENT

A questionnaire was developed, based on the roles of a tutor as described by Powell and Weenk [5], on the characteristics of project-led education and on tutor experiences at different engineering courses with project approaches. Seven scales were used, of which the first one contained three items on the knowledge of the tutor about project-led education in general and the way projects are run. The second scale consists of nine items on the attitude of the tutor towards the group, including e.g. items on availability, communication, respect and enthusiasm. The scale on the progress of the project contains 16 specific items on tutoring skills like suggesting resources, helping to distinguish between major issues and details, facilitating learning instead of teaching and providing feedback.

The next scale includes four items on critical thinking and problem solving skills, as these are considered fundamental in project-led education. Seven items on group functioning are in the fifth scale and focus on the tutor as a stimulator of team processes. The penultimate scale includes three items referring to the learning processes of the individual team members. The last scale comprises four items on assessment of learning. After 47 closed items, three open questions were included, concerning the expectations students have of a tutor in general and the strength and weaknesses of their tutor in the current project-led learning experience.

METHOD

The instrument was applied at the end of the second semester of the academic year 2006/2007 at the Fashion Design and Marketing course with 27 students participating in a project on a winter yarn for 2007 and at the Production Engineering course with 35 students working on a project on space tourism. The first project can be characterised as a project component, while the latter is an example of a project approach. Group sizes in both courses varied between 4 and 8 students per team. Each student of both courses completed a questionnaire with 47 closed items and 3 open questions.

RESULTS

The internal consistency of the seven scales of the Tutor Evaluation Questionnaire was estimated by the Cronbach alpha coefficient and generally considered satisfactory, as presented in table 1.

TABLE I
RELIABILITY ANALYSIS OF THE QUESTIONNAIRE

Scale	Item number	Mean	SD	Cronbach alpha
PLE Knowledge	3	12,31	28	,95
Attitudes	9	38,28	4,95	,85
Project progress	16	67,85	9,26	,93
Critical thinking-problem solving	4	17,15	2,39	,82
Team functioning	7	28,83	4,88	,90
Individual learning	3	11,74	2,39	,82
Assessment process	4	25,85	4,51	,55

The relatively low reliability of the assessment scale is entirely caused by one item. Removal of this item on the information about assessment provided by the tutor would increase the Cronbach alpha to ,93.

Table 2 and 3 show the results for each scale for both courses. The scores of the Production Engineering students are in general higher than those of the Fashion Design and Marketing students, except for the scale on assessment. Only two members of Team 5 of the Fashion Design and Marketing course completed the questionnaire, whereas the other team of this course and the other course had at least four members filling out a questionnaire.

TABLE II
RESULTS FASHION DESIGN AND MARKETING

Scale	Min	Max	Mean	SD
PLE Knowledge				
Team 1	9	15	12,60	2,88
Team 2	9	13	10,80	2,05
Team 3	9	13	11,25	1,71
Team 4	9	15	11,83	2,04
Team 5	6	7	6,67	,58
Team 6	10	15	11,50	2,38
Attitudes				
Team 1	30	45	39,20	5,89
Team 2	29	39	34,20	4,21
Team 3	34	40	37,00	2,45
Team 4	35	43	41,00	3,10
Team 5	24	26	25,00	1,00
Team 6	33	41	37,00	4,08
Project progress				
Team 1	49	78	66,75	12,45
Team 2	50	63	59,25	6,18
Team 3	66	68	67,00	1,15
Team 4	70	79	73,8	3,59
Team 5	44	50	47,00	3,00
Team 6	59	77	67,50	9,33
Critical thinking-problem solving				
Team 1	14	20	17,00	2,45
Team 2	7	18	15,00	4,58
Team 3	15	18	16,25	1,50
Team 4	16	20	18,67	1,75
Team 5	13	17	15,67	2,31
Team 6	15	17	16,00	,82
Team functioning				
Team 1	20	35	27,20	6,50
Team 2	22	33	27,40	4,62
Team 3	24	26	25,00	,82
Team 4	29	34	32,00	1,67
Team 5	16	20	18,00	2,00
Team 6	21	33	26,25	5,38
Individual learning				
Team 1	8	15	11,80	3,56

were activities that should be carried out by a tutor, in their view. Two students made a comment on the information that was provided and the time frame within which communication between student team, tutor and coordinating team took place. These students argued for more timely information on behalf of the tutors. Availability was another problem identified by the students. Two of them complained about tutors not being available when they should be.

DISCUSSION

In this study, the role of tutors in project-led education was examined using a questionnaire aimed at the evaluation of tutor performance. The instrument served, in the first place, as a starting point for the discussion on what should be the roles and responsibilities of a tutor in this approach to learning. It is important to note that the role of a tutor in project-led or project-based education is different from that of a tutor in problem-based learning (PBL). The fact that students have to develop a working solution for an existing problem and come up with a prototype, a program, a model or another concrete artefact as the results of their project, the highly interdisciplinary nature, the extended scope of the project in terms of time investment and the open ended nature of the projects require specific skills from a tutor. In the project experiences at the courses of the University of Minho, the role of the tutor had developed in a certain direction, being, however, not explicitly described in the documentation on the subsequent projects at the different courses.

The questionnaire used seven scales to evaluate the performance of the tutor and three open questions to collect information on expectations, strengths and weaknesses. The scales were all characterised by a high reliability, except for the last scale on assessment. The two different courses were characterised by different outcome in terms of tutor performance. In general, the tutors at the Production Engineering course were evaluated higher than those of the Fashion Design and Marketing course. Part of this difference can be explained by the fact that the teachers and the tutors at the Fashion Design and Marketing course completely coincide, whereas at the other course, some of the tutors are tutors only, which may clarify to students that the perception of the role of a tutor is different from that of a teacher.

The analysis of the closed and open items of the questionnaire showed that the expectations and experiences of the students do not completely coincide with the closed items of the questionnaire. Some students have specific expectations with regard to the role a tutor plays in the solution of the problem and the possibility to answer specific questions. They also identified a number of attitudes they consider appropriate, which are not part of the closed items. Analysis of these answers shows that it would be useful to define and discuss the role of a tutor in project-led education, both from the point of view of the student as well

as the tutor and other teaching staff. At the moment, the interpretation of the role of the tutor is rather undefined. Students have expectations and translate these expectations into a certain rating when they complete the questionnaire. A discussion and definition of knowledge, skills and attitudes that should and should not be part of the tutor's responsibility could help to improve the cooperation between student team and tutor.

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