Chapter 3.7.1

MODELLING BASED PROJECT EXAMINATION

Søren Antonius
Danish Institute for Upper Secondary Education, University of Southern Denmark,
Email: sa@ceu.s.dk

Abstract: In this article I present a case study of a project examination trial in one of the upper secondary education programmes in Denmark. I shall give some empirical support to the argument that this project examination can be seen as valid not only in relation to modelling but in relation to all mathematical competences.

1. INTRODUCTION

For 15 years modelling has had a central position in the Danish curricula in mathematics on upper secondary level. But teaching does not yet reflect goals and intentions. One of the reasons is probably that the final examination still consists of a traditional written examination with a number of independent, standardised, pre-structured and rather closed tasks, and an oral examination in which the student is supposed to define and explain certain concepts, prove certain theorems etc. Much can be said of these tests, but they are definitely not suitable for assessing open modelling, and what is not assessed tends to disappear from teaching.

A project examination trial was launched for a general course in mathematics on upper secondary level in 1999. The projects are prepared centrally and distributed to students on a CD. The first part of the projects consists of fairly traditional tasks, but the second part is based on an open modelling problem. Students work for 3 weeks with the projects – not full time, but in 15 math-lessons. They can use the teacher as a guide, and they can discuss problems with peers. They are also allowed to work on the project at home. All kinds of information technologies are allowed, including CAS. Each student must write his own report.
The teacher and an external examiner assess the report, but before deciding on a mark the student has to ‘defend’ the report in an oral test of 10 minutes. In that respect this trial is different from the Victoria-projects in Australia (Barnes et al., 2000). The oral defence is supposed to eliminate or reduce authentication problems. During the oral defence the teacher and the external examiner ask questions to certain parts of the report, which the student must be able to make an account for. Finally the teacher and the external examiner decide on a mark.

I should add that project examination substitutes the traditional written examination. There is no additional written test, and this also distinguishes the Danish trial from the Victoria-projects. In this respect the trial is – as far as I know – unique for a general course on upper secondary level, which prepares students for university studies.1

2. RESEARCH DESIGN

I have used quantitative as well as qualitative approaches in my research. The main focus has been on students’ and teachers’ (examiners’) attitude to the project trial, but in order to make a comparison I have also collected information on the traditional written examination. Part of my empirical investigations is a case study of one specific class of students working with the project examination in May-June 2002. I have made classroom observations during the 3 weeks of project work, and I have been present at the oral defence. Additionally, I have conducted a student inquiry based on a questionnaire for the class after having finished the reports. Finally, I have interviewed four students and the teacher after the oral defence.

3. PROJECT MARKS VERSUS MARKS IN TRADITIONAL WRITTEN EXAM

Students in project examination make considerably better results than students in the traditional written examination. The average mark in the project trial was for the May – June 2002 examination 7.9, and the corresponding average for the traditional written examination was 6.9, cf. Tab. 3.7.1-1. According to teachers particularly ‘less able’ students make better results in project examination than they would have done in the traditional written examination, whereas ‘gifted’ students make approximately the same (top) mark, as they would have made in the traditional examination.

But this does not automatically imply that project examination promotes learning to a higher degree than the traditional examination. However, I do think that this is the case. The reason for this position is not the marks, but