Chapter 2.2

WHAT'S ALL THE FUSS ABOUT COMPETENCIES?

Experiences with using a competence perspective on mathematics education to develop the teaching of mathematical modelling

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Abstract: This paper deals with applying a description of a set of mathematical competencies with the aim of developing mathematics education in general and in particular the work with mathematical modelling. Hence it offers a presentation of the general idea of working with mathematical competencies as well as an analysis of some potentials of putting this idea into educational practice. Three challenges form the basis of the analysis: The fight against syllabusitis, the dilemma of teaching directed autonomy and the description of progress in mathematical modelling competency.

1. INTRODUCTION

Mathematics education is full of buzzwords. These are words that add flavour to an analysis, a discussion or the planning of a teaching practice just by being mentioned. “Metacognition”, “project work” and “responsibility for one’s own learning” are good examples.

An underlying agenda for the structuring of this article is, that there are good arguments against using such buzzwords, the danger of replacing words for thoughtfulness being one. Consequently, one should always take a critical stance and ask the question: For what kind of challenges is this a potentially useful concept, and how should we understand and use the concept in the light of this?

Within recent years “competence” has been added to the list of buzzwords, at least in the northwestern part of Europe. In what follows, we shall
analyse the cognate concept "mathematical competence" by attempting to answer the critical question posed above.

Three potential uses of the concept are analyzed. In each case the analysis is spanned by a general problematique pertinent to working with mathematical modelling in mathematics education and one or more developmental projects attempting to use the competence perspective to deal with this problematique.

2. FIGHTING SYLLABUSITIS IN MATHEMATICS EDUCATION

What constitutes mathematics as a subject? Many things, of course, but we feel convinced that everyone will agree, that mathematics has to do with certain objects, concepts and procedures that we (tautologically) consider as mathematical. Many people use this relation to subject matter to characterize the subject. "Mathematics is the subject dealing with numbers, geometry, functions, calculations etc." is not a rare type of answer to the question of what constitutes mathematics.

What, then, does it mean to master mathematics? With reference to the above it is tempting to identify mastering mathematics with proficiency in mathematical subject matter. However, this belief if transformed into educational practice, is severely damaging. Damaging to the effect that it has been given the name of a disease, namely syllabusitis (Jensen, 1995). It is a disease because it fails to acknowledge a lot of important aspects: Problem solving, reasoning and proving and – in the context of this paper not least – modelling, just to mention some. Combined with the hardly ever challenged viewpoint that the aim of mathematics education is to make people better at mathematics, a curriculum infected by syllabusitis therefore fails to set an appropriate level of ambition and makes the educational struggle unfocused. Hence, it is important to address the following problematique:

Problematique 1: How can we describe what it means to master mathematics in a way that supports the fight against syllabusitis in mathematics education?

3. THE KOM PROJECT

This problematique was a main ingredient in a proposal by Mogens Niss for applying a set of mathematical competencies as a tool for developing mathematics education (Niss, 1999). The so-called KOM project (Niss & Jensen, to appear), running from 2000 – 2002 and chaired by Mogens Niss