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Conceptual Knowledge and Learning as a Reflection of Students' Motivation

P. S. Pietikäinen¹

Senior Lecturer
Aalto University School of Chemical Technology
Espoo, Finland
pirjo.pietikainen@aalto.fi

A. M. Mauno

Planning Officer
Aalto University School of Chemical Technology
Espoo, Finland
annika.mauno@aalto.fi

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It is well-known that highly motivated students achieve better learning results in higher engineering education. This research stems from an idea that the students' conceptual understanding could reflect their underlying motivational factors [1,2] to study. The research was set up within one course of polymer technology with students from four different degree programmes. Within this specific field of engineering the research examines 1) whether there are identifiable differences in the conceptual learning between the students in the different degree programmes 2) whether the conceptual learning could be linked with different motivational factors. The research was carried out during the years 2009-2011 in the course "Basics of Polymer Technology" (3 ECTS). This course is compulsory for students in four different degree programmes and it is taken by 150-200 students yearly during one 6-week period. The majority of the students is 2nd year Bachelor students. To compare both the factual and conceptual learning of the students from the different degree programmes, a two-part questionnaire was designed. The same questions were given to the students at the very beginning and in the end of the course. The first part contained questions of both substance knowledge and attitudes. The aim was to evaluate the development of students' understanding of basic concepts of polymer technology. The second part was an essay titled "Me and polymers ten years from now". The aim of this question was to discover how

¹ P. S. Pietikäinen, pirjo.pietikainen@aalto.fi



the students' conceptual understanding of utilising polymers had developed during the course. [3,4,5] The results of the first parts of the study have been reported in [6,7]. The results show that degree programmes socialize their students effectively: they seem to develop rather strong professional identities already in the very beginning of the studies. E.g. one group of students saw themselves in a role of bio-material developers whereas another group had the idea that polymeric materials will not be important for them professionally. Another interesting point was that a large number of students did not recognize the role of polymeric materials in everyday life. These perspectives reflect very different underlying motivational factors, which should be taken into account to ensure meaningful learning. The results could be utilized in developing this course in particular and, more generally, in developing the education on degree programme level by showing the potential of Engineering Education Research. ■

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