Abstract

The main purpose of the research this thesis is based upon was to study students' attitudes towards learning chemistry at university level and their motivation from three perspectives. How can students' attitudes towards learning chemistry be assessed? How can these attitudes be changed? How are learning situations experienced by students with different attitude positions?

An attitude questionnaire, assessing views of knowledge, learning assessments, laboratory activities, and perceived roles of instructors and student, was used to estimate students' attitude positions. It was shown that a positive attitude was related to motivated student behaviour. Furthermore, it was shown that factors in the educational context, such as the teachers' empathy for students learning chemistry, had affected the students. It was also found that students holding different attitude positions showed different learning outcomes and differed in their perceptions of the learning situation. Students' holding a more relativistic attitude more readily accepted the challenges of open experiments and other more demanding tasks than those holding a dualistic attitude.

In addition, the teachers were found to play important roles in the way the tasks were perceived and the development of students' ideas. In studied laboratory activities open tasks resulted in positive student engagement and learning outcomes. Preparative exercises, such as a computer simulation of the phenomena to be investigated, affected students' focus during laboratory work, encouraging them to incorporate more theoretical considerations and increasing their ability to use chemical knowledge. Finally, it was shown that students' focus during laboratory work is reflected in the questions they ask the teacher, implying that questions could be used as tools to evaluate laboratory teaching and learning processes.

The findings imply that students' attitudes towards learning and motivation, and the design of learning situations, are key factors in the attainment of desirable higher educational goals such as the ability to judge, use, and develop knowledge. For universities encountering students with increasingly diverse attitudes, motivation and prior knowledge, these are important considerations if they are to fulfil their commissions to provide high quality learning environments and promote high quality learning.