RECENT DISSERTATIONS

CHRISTINA BERGENDAHL, 2004:

Development of competence in biochemical experimental work: Assessment of complex learning at university level

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Abstract

Biochemistry is part of life science: a fast developing multidisciplinary area. The overall aims of this thesis and the work underlying it were to find ways in which to develop competence in biochemistry at university level and to assess complex learning. A particular interest was the development of experimental work as a means to promote learning.

The study focuses on changes made in two educational settings. The aim of the changes was to develop competence, amongst both students and teachers. Therefore, the research in the three first papers has in some aspects, and to different extent, the characteristics of action research. Broadly, the changes can be described as making experiments more open, with multiple formative and authentic assessment methods involving both students and teachers. The empirical studies included questionnaires, interviews, questions asked during experimental work, written material as formulated objectives, examination questions and answers, reports, other products; and grades/judgements made by teachers and students.

The main results can be summarized as follows;

The students' learning was improved by open ended versions of experimental work, according to both their and the researchers' opinions. Planning, approaching problems from different perspectives and evaluating the results of their own experimental work promote the students' capacity for higher order cognitive thinking. However, the synthesis level constitutes a threshold and particular support is needed for students with a more dualistic view of teaching, learning and experimental work.

Introducing formative and authentic assessment is a way to help students to make progress, and to develop competence. The importance was clearly demonstrated of involving both teachers and students in discussions of aims and criteria and of making them explicit. Feedback from teachers' and students' own reflective activities about subject content, and their learning as well as affective factors were shown to be central for complex learning. Based on our studies, areas were identified for the critical development of competence and for promoting learning in biochemistry at university level. These areas are; multidisciplinary and complex learning, communication skills of different types, metacognitive perspectives, attitude development, and affective factors.

The students see experimental work as crucial for their learning and therefore important in terms of assessment. Therefore, experimental work can and ought to be assessed. However, similarities and discrepancies were observed between students' and teachers' perspectives for both the aims and assessment of experimental work. Our conclusion is that a combination of assessment methods is needed in order to be able to make a high qualitative assessment.

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Christina passed away June 19th 2005 only 49 years old. Our condolences go to Christina's family, friends, and colleagues in Umeå