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AN IN-SITU PROFESSIONAL CONCIEVE-DESIGN-EXPERIENCE IN AN INTERDISCIPLINARY CONTEXT: ENGINEERING STUDENTS IN CHEMICAL BIOLOGY PRESENT RESEARCH PLANS TO MEDICAL DOCTORS.

Maria Sunnerhagen[2], Magdalena Svensson[1], Ewa Ehrenborg[3], Uno Carlsson[1], Lars-Göran Mårtensson[1], and Lena Tibell[3].

1. Division of Biochemistry, IFM, Linköping University, Linköping, Sweden.
2. Division of Molecular Biotechnology, IFM, Linköping University, Linköping, Sweden.
3. Department of Medicine, Karolinska Institute, Stockholm, Sweden.
4. Department for Biomedicine and Surgery, HU, Linköping University, Linköping, Sweden.

ABSTRACT

A major part of the professional role for many of our Bioengineering students will be to be able to explain background and suggest strategies for professionals with other specialities. Thus, the students will need to confidently be able to enter the role as experts in their field. However, in university learning, the students are used to the teacher being the expert, which hinders them to act in this role. To redeem this, we have developed a novel way of examination, where the students are indeed the experts, and the examiner is a professional of a related field. The aim is to encourage the students to confidently enter the expert role by putting them in a situation where they have to explain their expert knowledge in a way understandable by non-experts. The interdisciplinary environment in which the examination takes place serves as an additional motivating factor, which also encourages higher-order cognitive learning.

INTRODUCTION AND BACKGROUND

A major aim of university training is to prepare students for their future role as experts in society, industry or research. During a master's education, it is thus important that the students are encouraged to practice entering the role of a

professional in their field of training. However, in the learning situation, students are used to the teacher being the expert, which hinders them to act in this role.

It is well known that meaningful learning and student motivation is much elevated if authentic tasks are practised, and if the students are given an expert role (Coppola, 1995; Coppola et al., 1997). Furthermore, it is well known that student learning is related to the method of examination. One way of encouraging the students to take the expert role would thus be to provide the students with a situation during the examination where they are indeed the experts. This would then much resemble the situation in their future profession, where they will need to explain their knowledge in a way understandable to non-experts.

In the course of Biomeasurement Technologies, the Bioengineering students are trained to use and develop research strategies using a multitude of biophysical techniques. Such knowledge is not common among for example medically trained experts, which thus fairly early in their training (beginning of 3dr year of study) puts our students into a unique expert position. We have used this course as a basis for developing an interdisciplinary examination method.

OUR APPROACH

We have designed a part of the final examination of the course in Biomeasurement Technology for engineering students in Chemical Biology as an oral presentation for an external examiner with medical expert training. The students are given the task to present a research plan on a protein studied by the visiting expert, using course methodology which is usually not familiar to a Medical Doctor. In practice, we give to each of two student groups (~30 students) one target protein, and ask the students to choose one method which they will present to the Medical Doctor, together with an applied research plan for the study of the target protein. Ideally, the target protein is of major scientific or clinical focus to the Medical Doctor who will examine the group.

In the oral presentation, the students start by presenting their methodology, approach and research plan. After this, the Medical Doctor asks questions to the students regarding all aspects of the presentation. Notably, the MD is no expert in the methodology used, and will thus ask questions that range from trivial to unanswerable. Thus, there is no way that the students can prepare for the questioning other than really go into depths in the understanding both of their methodology and in the research questions that can be asked and answered by their proposed research plan. In a way, this forces the students into a deep learning approach. During the presentation, the ordinary teacher together with a colleague grades the performance with respect to both generic and subject-specific skills using a Bloom-graded evaluation matrix. The examination has also been performed in reverse, i e students of Biomedicine at Karolinska Institute,

Stockholm were examined by a professor in Molecular Biotechnology from Linköping.

The project was much appreciated by the vast majority of students at both universities for its high authenticity and professional relevance. Impact on higher order cognitive reasoning as measured by interviews and Perry evaluations were highly significant, and we could detect a shift in motivation factors for learning towards higher Bloom levels. To achieve this, it should be noted that we have used an indirect route, by putting students into situations where increased responsibility is implicitly required. A major outcome of the examination has also been that the students became more aware of the extent and depth of their own knowledge.

CONCLUSIONS

To practice the role of being an expert, and in a meaningful environment, we have chosen to let students in Bioengineering and Biomedicine present part of their examination before a professional of different expertise. This interdisciplinary method of examination was highly efficient in elevating higher-order learning skills as well as in encouraging cognitive reasoning. The examination was also much appreciated by the students for its high authenticity and professional relevance.

REFERENCES

No references.