

Learning Fields in Vocational IT Education – Why Teachers Refrain From Taking an Opportunity

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ABSTRACT

Vocational education in Germany is characterised by a learning venue cooperation between vocational schools and vocational training companies. For a better combination of theory and practice the curricula in the field of computer science (CS) and information and communication technologies (IT) are arranged in so-called “Lernfelder” (learning fields), which gives the teachers the leeway to develop different learning situations on their own. Unfortunately, it seems that teachers often do not put this idea into practice. The question is: Why would vocational IT school teachers willingly relinquish these benefits? The elicitation study described in this paper explores the IT teachers’ knowledge of and attitudes towards the concept of learning fields in order to find an answer to that question. It is part of a project which aims to develop exemplary learning situations and helpful tools for several learning fields, which will make it easier for the teachers to create lessons in the context of learning fields.

Categories and Subject Descriptors

K.3.2 [Computers and Education]: Computer and Information Science Education—*Computer science education, Curriculum, Information systems education*

General Terms

Human Factors, Theory

Keywords

Vocational IT Education, Computer Science Education, Learning Fields, Learning Situations, Teachers’ Attitudes, Empirical Study, Elicitation Study

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1. INTRODUCTION

1.1 The Vocational School System in Germany

The German school system and especially the ways to professional life differ from the systems of most other countries. Students can attend an upper secondary school, called “Gymnasium”, where they get a general qualification for university entrance. Another way is attending general or intermediate secondary schools, where students get general education and are prepared to take up training and education at a company and part time vocational schools (so-called “Duale Berufsausbildung” – dual vocational education and training). During this time students are employees of their companies. The students’ age is between 16 and 25 years and their previous skills are quite heterogeneous. At the end of the training students receive a vocational certificate from the chamber of industry and commerce or the chamber of trade. The heterogeneity of the students implies different types of learners in each class, which need different types of instruction to benefit from lessons [3]. For this reason the learning content in the curriculum is arranged in so-called “Lernfelder” (learning fields). Learning fields do not include specific aims to be reached or skills to be acquired, but they describe different competencies which students should gain. By alternating multidisciplinary theoretical and practical training, students should acquire the competencies to apply their skills in new professional situations. The idea of cooperation between vocational schools and training companies and the integration of work and study spreads in vocational systems of different countries [4] [6]. So it can be worthwhile to exchange the experience with these concepts in the field of IT.

1.2 Significance of “Learning Fields” for IT/CS Education

A learning field contains typical business and working areas, which are reflected and reconstructed professional activities [2]. A learning field includes theoretical and professional skills from different subjects as well as social and personal competencies. The concept was developed to better meet the requirements of all partners of the dual vocational education and training. The different learning fields are designed openly; it is up to the teachers to implement the learning fields into suitable learning situations. A learning situation is one didactically prepared working process. It contains theoretical knowledge, several working skills and different competencies to solve complex problems and can in-

clude difficulties from different subjects. All activity-oriented methods can be used. That concept may cost time in the beginning, but one part of the concept is to teach in teams, so teachers from different disciplines can share the workload and support each other. Concepts of interdisciplinary collaborative teaching and learning can be found in different scenarios of vocational training and education, e. g. in mechatronics [8] or in computer engineering education in Egypt [7]. In the area of IT the definition of the learning fields has not always succeeded. Most learning fields seem to be identical to the former subject [5]; it is tempting for IT teachers to work with the familiar subjects without thinking further about the specifics of the learning field. It appears that especially in IT-centered vocational schools the concept is hardly implemented by the teachers; we tried to find the problems teachers meet when translating the described competencies from several learning fields into adequate learning situations. The question was: why would vocational school teachers refrain from using the leeway given to them by the curriculum? Therefore we conducted an online survey with several vocational IT teachers¹. In this paper we present the first part of the results of this elicitation study. It is part of a larger project with the purpose to convince vocational IT teachers to devise their classes according to the learning field concept by developing exemplary learning situations or helpful tools for several learning fields.

2. METHODOLOGY

We asked all vocational IT teachers in Bavaria (Federal State in Germany) to participate in the online survey. 28 teachers answered (a response rate around 30 %). The online questionnaire consisted of three sections. First, all participants were asked for their age, sex, vocational discipline and their years of teaching (as range). The second section contained 16 closed questions about the IT teachers' knowledge of and attitudes towards the concept of learning fields. We used a 5-point scale answer format with options from "does not apply at all" (1) to "fully applies" (5). The third part consisted of open questions, which explored the teachers' attitudes toward the concept of learning fields following the theory of planned behaviour by Aizen and Fishbein [1] and the situation at different schools.

3. RESULTS

We got replies from 21 men and seven women with the average age of $M = 47$ years. The median of the years of teaching is within the range of 11 to 15 years. 16 teachers are basically educated for teaching IT. The answers of the second part of the questionnaire were summarised following the theory of planned behaviour by Aizen and Fishbein [1]. Only the first question about familiarity with the concept of learning fields does not represent this theory, but shows an individual estimate of the personal skills on this topic. The participants reported a very high familiarity with the concept ($M = 4.21$). The results of the items about the teachers's attitudes ($M = 3.36$), their self-efficacy ($M = 3.21$) and their subjective norms ($M = 3.25$) indicate that the teachers are principally open-minded to the concept of learning fields. Only the factor control belief ($M = 2.83$) shows a lower value, which could mean that the teachers see some difficulties to implement the concept. These results were

¹IT teachers include also teachers for computer science

verified by a content analysis of the answers on the open questions. The responses to the first four questions were paraphrased and categorized [1]. We produced $N = 151$ statements. The statements about the teachers' attitudes ($n = 47$, 31.1 %) specified the information of the closed questions; the teachers described the advantages and difficulties they see in dealing with the concept. The statements about the teachers' control belief ($n = 102$; 67.6 %) dealt with the school equipment, the strong heterogeneity of the classes or the teaching staff composition. Only two statements about the subjective norm were found, which praise the colleagues' and the headmaster's support. The examples of organization and learning situations are not analysed yet.

4. DISCUSSION AND CONCLUSION

The question of this study was: Why would vocational school teachers refrain from putting the concept of learning fields into practice? The results of this study show different aspects of the problems teachers have. The answers show that the teachers are motivated to implement learning fields into suitable learning situations, but it also seems that they need support to do that. In our opinion it seems to be helpful for the IT teachers to support them by developing guidelines with examples for learning situations and the related teaching material. It is also important to train the teachers on how to develop learning situations themselves, also in difficult environments, and how to evaluate criteria for appropriate learning situations.

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