Abstract

A gap between real life and theory often exists in academic education. However, this gap can be crossed in IS/ICT curriculum. As an attempt at the University of Jyväskylä we ran a Career paths of IS course for new information systems students during the first month of their studies. The aim of the course was to strengthen students' motivation to proceed in their studies in IS/ICT, their professional identity building, and to give them possibilities to reflect in their own interests within the field and thus help them make choices during their studies.

In this paper we present a case study of the Career paths course which is scrutinized from the perspective of the working life orientation. The results are based on a student survey at the end of the course. The paper also discusses the results of the survey in the light of Curriculum Guidelines of ACM and AIS.

Keywords

Information systems education, professional identity, working life orientation, career paths, ACM/AIS curriculum guidelines.

Introduction

Robertson (2011) claims that especially in business studies a gap between real life and theory exists. To cross this gap it is essential to connect students to real world problems since the start of studies. Schunk (2004) also argues that a learning strategy through experimental approach from experienced experts is more effective, because it makes the learner an investigator who systematically varies conditions (independent variables) and observes changes in outcomes (dependent variables). This helps to minimize the gap between real life and theory.

In the faculty of IT at the University of Jyväskylä in Europe this fact has been recognized since the 70s when a project work course was launched first time. Pirhonen (2009, 2010) have shown that students find their skills in communication, teamwork, and personal development significantly improved during the course. According to a study of Tynjälä et al. (2009), variety of skills and know-how are needed in a work of a project manager in the field of information systems were learned. In addition, the students' communication with real customers has been a valuable part of in University of Jyväskylä's IS/ICT curriculum improving professional identity and qualification (Isomöttönen and Kärkkäinen 2009).

However, to be qualified for the project work course a lot of basic IS/ICT developer skills must be learnt before the course. The students should be motivated to study the field and learn complicated technical issues at the beginning of studies. This can be accomplished by supporting students' working life orientation, which has been theorized by Penttinen et al. (2013). A new course called the Career paths of IS was created for the first year students. The core point in this course was to build a connection to working life by providing expert lectures given by working life professionals and connecting them to reflective tasks. The course was run for the first time at the beginning of the academic year 2011-2012.
Our main research question is how the Career Paths course supported students’ working life orientation. The data was collected by administering a questionnaire in the end of the course (n=90) in the academic year 2013-2014 and the data was statistically analyzed. Our aim is to lay out implications for the development of this course, as well as other courses in the field of information systems. Therefore, we reflect both, the model of pedagogical working life horizon and the results of this course, on the Curriculum Guidelines by ACM and AIS for Undergraduate Degree Programs in Information Systems (Topi et al. 2010). The significance of these recommendations has been shown a paper by Osatuyi and Garza (2014). According to this study, the most of undergraduate IS are fully compliant with these guidelines. On the other hand Lo and Cruz (2014) have reported that ACM & AIS guidelines are rarely followed by the top-ranked universities of the US.

In the following we present the course outline and the case, the theoretical framework, the results of the empirical study and the discussion. First, we present the course description. This is followed by the theoretical framework for our case is based on the model of pedagogical working life horizon (Penttinen et al. 2013). The empirical part includes the evaluation of students’ working life orientation after the Career paths course at the beginning of the IS undergraduate studies.

**Our Case**

In the year 2011 the steering committee of the information systems science department decided that new students should be motivated in a new way to learn theoretical content. Thus, the department launched the career paths of IS course in the fall of the year 2011 (Makkonen and Vaidya 2012). The course of the academic year 2013-2014 was improved, covering ERP and social media areas, because these are important in current business activities supported by ICT.

The learning goal of the course was providing real connection between IS/ICT jargon and real life needs in IS/ICT work. Led by this guiding star the course included three basic elements

- expert lectures by the former students (alumnus) of the ICT faculty,
- individual lecture diaries (reflective learning journals) written by all the students, and
- student assignments and presentations on ICT professions of their choice.

The lecture program was based on the information systems science curriculum at the University of Jyväskylä. Therefore, expert lectures represented different phases, aspects and roles on information systems lifecycle. The experts provided 10 lectures. The topics of the lectures are presented in table 1 (see next page).
Through the lectures the students were expected to gain understanding of the skills and technologies needed in IS/ICT professions during an information system lifecycle. In addition, the goal was to support the development of professional identity, which should be a process starting at the beginning of the studies. Our claim was that in this way the students would be motivated to learn both work management issues and advanced technologies included in our curriculum.

To provide an active learning experience every course participant was expected to write findings after each lecture. In this way the students created lecture diaries and these were returned after all the lectures. The students needed to participate in 6 lectures as minimum. From each lecture students needed to report what they have learned, what was emphasized by a lecturer, and why a lecturer rated his/her profession significant in the field of ICT.

In academic work and studying one of the main points is providing own contribution. To fulfill this requirement we ran an assignment including students’ own studying concerning ICT professions. The students needed to search for the information on the web to find information on four typical ICT professions. Most of the students (86%) worked in the small groups of two to five students. The others completed this part individually. The outcome of this exercise was presented either as a wiki presentation based on the text material or as a video presentation on our wiki site.

**Pedagogical Framework and Working Life Horizon**

Many learning theories emphasize the meaning of real life experiences in learning processes. In the current era, one leading theory is constructivism. Jonassen (1994) has summarized the main elements of "the implications of constructivism for instructional design" as the connection to the real world, authentic tasks and allowing context and content construction by fostering reflection and collaboration. The same elements are elementary in most andragogical approaches, focusing on adult learning through life experience (Kolb 1984; Rogers 1996).

Following the traits of Vygotsky and Dewey, today’s constructivist approaches are by nature social and emphasize the active role of the learner. Accordingly, in this learner-centered teaching or student-centered learning approach, knowledge is constructed by students, and a lecturer is a facilitator of learning rather than a presenter of information (Rogers 1983a, 1983b; Prosser and Trigwell 2002). It is a learner who interacts with his or her environment and thus gains an understanding of the subject matter.

Penttinen et al. (2013) have created a theoretical model of a pedagogical working life horizon in order to enhance these pedagogical ideas. The core of the model is constructed of three working life orientation

| Lecture 1 | The roles of ICT development in the software development company (Tieto Plc. - tieto.com) |
| Lecture 2 | The work of the test manager and the services manager at the Finnish parliament |
| Lecture 3 | Developing health care information systems |
| Lecture 4 | Data security and risk management in the metal industry (Metso Plc. - metso.com) |
| Lecture 5 | Working as researchers of digital media and electronic commerce at the University of Jyväskylä |
| Lecture 6 | Working as the consultant, the project manager, and the development manager at digital services industry (Digia Plc. – digia.com) |
| Lecture 7 | Developing information systems for public social services |
| Lecture 8 | ICT in mobile operator business at multinational Teliasonera (TeliaSonera Finland Plc. – teliasonera.fi) |
| Lecture 9 | Developing ERP systems |
| Lecture 10 | Developing social media services |

Table 1. Lecture Topics
elements: (1) the working life relationship of an individual, (2) knowledge and skills in working life and (3) employability. The working life relationship of an individual refers to that person’s conceptions and experiences of work, constructed through our socialization, upbringing, education, and life experience. Knowledge and skills for working life involve the know-how and expertise that students should develop during their studies. The skills can be divided into two categories, general or transferable skills and field-specific skill. Employability refers to the individual’s knowledge of working life practices, of work sectors, and of the labor market. It also relates to an ability to find employment suitable to one’s own proficiency and personal capacities, to develop a capacity to recognize one’s own abilities and to match possibilities at work, and job-seeking skills.

Different aspects of the working life horizon can be supported and connected to any teaching and studying activities in a number of ways. There are two key pedagogical elements supporting the implementation of the pedagogical working life horizons model: reflection and an inquiring attitude. These elements can be “scaled” between education and working life throughout the whole study process. This scaling can be included in curriculum issues, guidance, personal study planning, teacher tutoring, peer support, peer mentoring, mentoring, support by students’ union activities, internship, student exchange, projects and thesis work, work experiences, and also in individual courses. Similarly, Tynjälä’s integrative pedagogy model (2008) emphasizes that supporting students’ growth towards professional expertise takes place by creating connections between theoretical, experiential (real life) and self-regulative (metacognitive) knowledge through reflection. Thus, our course consisted of lectures given by real ICT professionals representing different sub-areas of ICT. In addition, students reflected upon the lectures in written personal learning diaries and searched for further information on ICT professions from Internet and other sources.

In relation to the working life orientation, the ACM & AIS curriculum guidelines (Topi et al. 2010) emphasize the second aspect of knowledge and skills, both field specific and generic. The high-level of IS capabilities are defined, as well as four key elements of IS profession, which are both based on the needs of today’s IS specific working life. The actual curriculum outlined in the guideline consisting of seven suggested courses, which are built from the perspective of the high-level capabilities and the professional key elements.

The elements of the Career Paths course support the working life orientation by developing the individual working life relationship, by providing views to knowledge and skills needed in the working life, and by giving the idea of the possibilities for future employability. Thus, it broadens the student’s working life horizon.

**Analysis of Student’s Working Life Orientation**

The data for this study was collected by administering a questionnaire at the end of the course. The respondents included 90 students, 22 females and 68 males, and the average age was 22 years (range 19-37 years), completed all items on the questionnaire. 96% of the respondents studied information systems as a major subject.

The questionnaire items were based on the working life horizon theoretical model created by Penttinen et al. (2013). The statements had been clustered in variables according to the three categories: (1) the working life relationship of an individual, (2) knowledge and skills in working life, and (3) employability. Each variable consists of 10 statements relevant to that particular element. The number of respondents was 90 in regard to all statements and the used scale was 1-4 (1 = Strongly disagree - 4= Strongly agree).

The analysis included basic statistical analysis (means, standard deviations, the ANOVA test for statistical significance). The data for this study agreed with normal distribution. Statistical analysis was made on SPSS 20.0. The means and standard deviations of each statement are presented in table 2 (see next page). We analyzed whether or not significant differences can be found between three variables. The ANOVA showed that significant differences exist between all these variables (p<.001)
Table 2: Working Life Horizon Variables

The means of the variables in each category are all quite high, above 3 (scale 1-4). From this perspective the course has succeeded to support the students working life horizon well. The highest variable category is Employability (3.13). In the career paths course the clear aim was to connect the students’ ideas of the subject and field to the experiences of the experts from working life. This perspective supports mainly the ideas of students’ careers and field requirements, which gives them great important information that can steer their choices during their studies.

They have also gained knowledge of the working life and skills requirements by learning these aspects from the lecturers and the task they had to do in the course. The students report the course helped them...
to understand the meaning of knowledge and skills from the working life perspective and thus to make better study choices.

The working life relationship of an individual was altogether the lowest working life orientation category. The course helped the students to see meaningful career paths and jobs for oneself and to consider own relationship to work and working life, but it didn't help the students to reflect and analyze their own attitudes, possibilities or previous work experiences in the same depth.

The course seemed to best support the awareness and knowledge on different careers, the knowledge and skills needed in working life and what is meaningful and interesting to self. The courses did no, however, as much support the ability to structure expertise, identify personal know-how or strongly increase trust in the future. These findings support the learning goals and implementation of the course. The tools for reflection and collaboration have helped the students to create a conception of the working life in their own field and thereafter see the meaning of studying both, subject specific and more general matters. The course tasks did not provide the students with analytical tools for self-assessment of previous experiences or know-how, and thus these aspects of the working life orientation were not equally strengthened.

Conclusion

In this paper we analyzed how the career path course of IS has supported first year students’ working life orientation. The students appear to be concerned about their future working life and the related issues are relevant to them since the beginning of their studies. The students reported that the course has especially strengthened employability that is their knowledge of working life practices, work sectors, and the labor market. The highest individual statements are related to understanding different career paths, better awareness and understanding of the knowledge and skills required in the field, especially interaction and collaboration skills, and finding meaningful career paths for oneself. Furthermore, the students report that they gained knowledge that helps to make choices in their study path and also reflect on personal working life relationship and goals.

All the above aspects are important and support the goals set for this course. They help to improve the students’ professional orientation, study motivation and later on transferring to the labor market. Furthermore, in the open answers the majority of the students reported several positive outcomes of the Career Paths course. However, these results will need to be analyzed in more detail in the future.

Theoretically this study shows that the model of pedagogical working life horizon can be useful in the analysis of courses and help to identify how well they support students’ working life orientation. Similar data collection has been made on several other courses and in the future more empirical work will be published, which will give more opportunities to test and develop the model further.

The results give ideas to the next evaluation round of the information systems science curriculum at the University of Jyväskylä. We should emphasize issues, which are connected to the individual learner, learning content, study conditions, and employment process. In addition, the interpretation of our results depends on the academic entity. Every institution is responsible for creating own curriculum and has its priority areas. Thus, our results should be reviewed from the perspective of each academic entity.

In relation to the ACM & AIS curriculum guidelines (Topi at al. 2010), the Career Paths course goes under the IS 2010.1 Foundations of Information Systems core course. In the description of the seven core courses the course, its learning objectives and three-level knowledge areas (Information Systems Specific Knowledge and skills, foundational knowledge and skills, knowledge and skills related to domain fundamentals) are defined in detail. As the professional elements of the subject matter are well defined and covered, it is more a question of supporting the connections between real working life, theoretical knowledge, students’ individual perspectives by facilitating the reflective elements, through which the students metacognitive skills and understanding are made explicit and have a possibility to develop throughout the educational process.

Thereafter, a major disadvantage of the guidelines is the lack of explicit ideas for pedagogical implementation, the role of which should be understood as aims and outcomes of any course, alongside of the subject matters of the course. The working life orientation approach can support the ACM & AIS curriculum guidelines by suggesting relevant approaches from working life and students’ orientation. In addition, the elements of integration and reflection and in general the role of pedagogy matters. The roles
of learners, the connections to real working life, and places for reflective work and self-assessment are crucial in the promotion of the holistic expertise. These lessons learnt from the working life horizon approach may help in the adoption of ACM & AIS guidelines, because as mentioned in the introduction, the top-ranked US universities have rarely adopted these guidelines (Lo and Cruz 2014).

The courses (such as project management) that provide an ideal place for building on aspects of individual working life relationship and employability should be identified. Even so, all the three elements of working life horizon should be seen and built in the curriculum as a whole, as well as each individual course.

In the future the study could be expanded by analyzing the open answers of the learning outcomes of the course. Many students reported that the course clarified their understanding of the working life and motivated them to study the field. This kind of training requires the evaluation of longer-term effects of training. A new survey after the students of this study have received bachelor or master degrees results could show the long term effects of our training. These results could also be supported by interviewing selected students.

Another significant issue in our further study is to analyze how different genders benefited from our training. In discussion on ICT education the small number of female students has been recognized as a problem. For example in the 2000s under the Update consortium (Update 2008) has been conducted research concerning motivating young females to study technology. Based on these studies both pedagogical and motivational solutions have been suggested for improving females’ interest to study ICT (Chatoney and Andreucci 2009) (Dakers et al. 2009). However, these studies are focused on students before university studies and still in the year 2010 for example at the University of Jyväskylä 1329 males and only 365 females studied for undergraduate ICT degrees (Kokko 2011).

References


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