DEVELOPMENT OF AN E-LEARNING PLATFORM FOR VOCATIONAL EDUCATION SYSTEMS IN GERMANY

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ABSTRACT

This paper describes an existing web-based learning platform named "Third Place of Learning" (TPL) - "Dritter Lernort". This project's aim is to connect the system of vocational education with digital media by a web-based learning platform. TPL supports student's digital learning by means of interactive examples and exercises. Learning material is produced along a didactical concept. The technical structure is as well developed along a didactical concept as the learning content.

KEYWORDS

Vocational education, web-based learning, technical product designer

1. THE THIRD PLACE OF LEARNING

Germanys current shortage of skilled personnel evolves to a barrier, which negatively affects the national economic potential. The project "Third place of learning" (TPL) [TPL14] aims to qualify more trainees in stopping this negative trend and tries to optimize the quality of vocational education. Exploring the potentials of digital media for vocational education is a further aim of this project. The collaboration partners develop a concept for a web-based platform, which provides training content and e-learning tools for technical product designer. These e-learning tools can be used by vocational schools, business companies and trainees [HeLM14.2]. Using digital media to provide teaching and learning material with an e-learning platform for trainees and business-instructors has a huge potential. It is fact that more than 70% of young people between 10 and 18 years use the internet to search for job and trainee information [HeLM14.2].

1.1 Digital Media and Dual Vocational Education

The dual vocational education system exists in three European countries: Germany, Switzerland and Austria. It consists of schooling and training on the job as concurrent activities. Trainees learn basic information or skills in the classroom and the practical implementation while working for associated companies. In general, this dual system of vocational education is regarded as a very effective way to train young people. However, there is potential for improvement. Current disadvantages of the dual system of vocational education are [BIB01]:

- Limited technological infrastructure of small companies.
- Different points of time for the transmission of specific knowledge from the curricula in schooling and job training.
- Lack of communication between the teacher of a vocational school and business companies.

Using e-learning tools supports trainees and teachers at the same time. Furthermore, these tools help to improve the named disadvantages above. TPL offers the possibility to collect data of individual learning rates. Further, TPL supports the transmission of knowledge across different locations and learning times [TPL14]. Basic information like the basic functions of a computer-aided-design (CAD) program, for example, can be taught in a new way with tutorials, practices and self-learning modules. Incidentally, trainees and teachers can create their own learning content as well as specific learning modules. During the project TPL will provide learning material specialized for technical product designer.

2. CURRENT STATUS OF THE PROJECT

The aim of an initial survey stage is to identify topics and available educational material in cooperation with the vocational schools and business companies. The result of this project's stage is to develop a catalogue of requirements about how to develop a technical structure, didactical content design and content topics.

2.1 Applied Survey Methods

Professional training in Germany is based on (national) training regulations for vocational schools and business companies. Within the first stage, training regulations are analysed to detect suitable topics for e-learning. During the second step, interviews of teachers and business-instructors are conducted to gather information about didactical ideas and proposals for the platform's technical structure.

2.2 Results of the Training Regulation Analysis

The training regulations for the technical product designer consist of 18 learning sections. The two learning sections shown in Figure 1 are part of the training content for the first and second year. By doing a survey with the teachers about the training regulation for vocational schools the results show that 100% of the learning topics within the first learning section are suitable for e-learning modules. The survey additionally results showed also that the fourth section contains only 75% of suitable topics for e-learning materials.

Suitability content for E-Learning (exemplary selection: learning section 1 and 4)

learning section 1: Analyze and report technical systems

learning section 4: Execute orders customer-oriented

0,00%   10,00%   20,00%   30,00%   40,00%   50,00%   60,00%   70,00%   80,00%   90,00%   100,00%
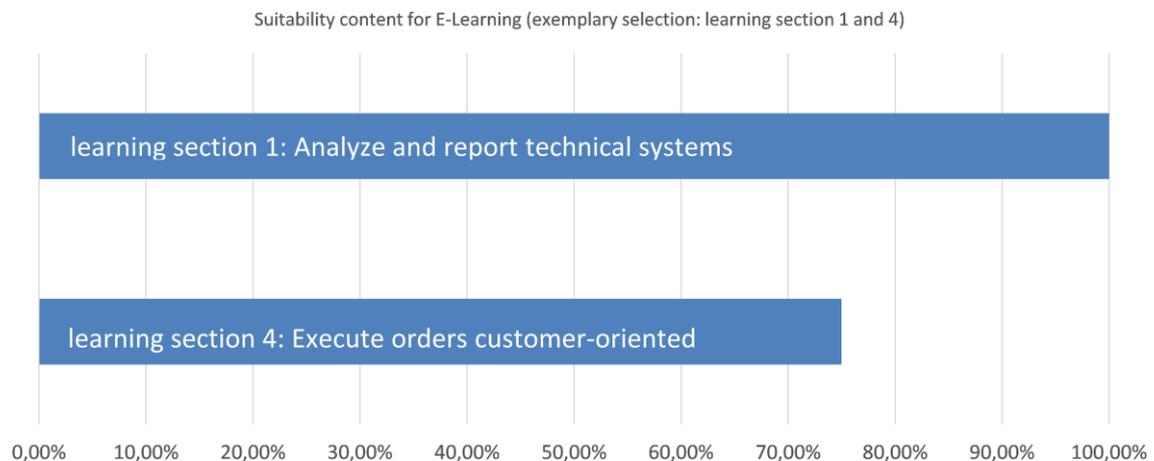
Figure 1. Training regulations for vocational training, learning section 1 and 4

During the first learning section trainees learn basic tasks and skills, for example free-hand drawing or the usage of CAD-systems. These are basically single handed learning tasks with a PC. In contrast, learning section 4 requires teamwork while working on a customer order. At the end of this section the trainees have to compare their results with the results of other teams. The necessity of intensive personal communication is the reason that this learning section has a lesser e-learning potential.

The results indicate that all 18 learning sections are similar. 15 learning sections were assessed as 100% suitable of developing e-learning content for their topics. Main topics of the developed modules are: engineering drawing and documentation, virtual construction, materials science, manufacturing processes and project-quality management.

2.3 Structured Interview Analysis' Results

The analysis of structured interviews pointed out that teachers and business-instructors recommend content oriented developing during the working process. Therefore, didactic conception of teaching and learning modules will challenge trainees in collecting self-reliant information, planning the execution, create a product and checking results. According to specific topics of the learning sections, new material includes learning content, learning objectives, exercises, tests and also provides a learning video. To summarize, the didactical conception of all materials and the design of the user interface support self-organized learning.

The communication structures of TPL have to ensure a secure and easy way of communication between teachers, business-instructors and trainees of all participating business companies in all directions. A multidirectional communication tool will be developed.

Three internal working spaces, one for the vocational schools, the business companies and trainees, will be provided by the e-learning platform. The working spaces of vocational schools and companies create the possibility of working with the trainees at internal topics, exercises or test. The working space for teachers and business-instructors provides functions for developing new teaching learning materials and store internal documents.

The working space for the trainees contains the self-learning materials, the possibility to establish learning groups between trainees, a glossary and a link collection to support the learning processes. The following section describes the further steps of the development.

3. NEXT STEPS

The next steps during 2014 include the realisation and implementation of the platform. Generating learning content for technical product designers and taking account of the didactical concepts is also planned.

3.1 Designing the Web-Based Platform

Developing the platform includes technological realisation and creating its content. The first stage consists of designing a platform and its implementation. After installing basic elements, e-learning modules will be added to the platform. This implies a parallel execution of developing the web-based platform and creating the content.

Learning and teaching material should be provided in hypermedia, which are different kinds of media formats. This allows teachers, business-instructors and trainees to work with the content on- and offline. The content is presented directly on the platform in a PDF file and as a presentation; this will be supported by videos. The modules will also include different tests to control the individual level of knowledge.

Therefore, TPL uses an open-source learning platform "Moodle" [TPL14]. "Moodle" can completely be adapted to the demands of a given project and area of work, for example, the different working spaces for teachers, instructors and trainees. With the user's help of a role system "Moodle" users have the opportunity to decide which information, topics and the amount of detail are visible to other user. Furthermore, it supports self-organized learning like basic information of gradually explaining an engineering drawing [TPL14]. For example, a learning module starts with an introduction about free-style drawing, then sets out line widths and completes with standards [HeLM14.1]. Additionally "Moodle" supports different forms of tests like multiple choices tests, free text questions or self-learning packages. "Moodle" evaluates the used learning modules automatically. The results of an evaluation will be used within the project to improve the developed platform.

3.2 Developing Teaching and Learning Content

Preparing content for the dual training of technical product designers is the key task of the project. The next step before developing learning and teaching content is to gather learning and teaching materials, which are used in vocational schools and business-companies. The dual vocational education is subdivided into stages, which could be reused as a general procedure for the training. The materials on the platform will be arranged to this periods. Using the didactical concept as a basis the collected teaching and learning content can be rewritten and used to create new content. Vocational schools and business-companies are involved during this step. Business companies assess the new materials and support the development of material for future users. The results of this assessment will be evaluated and used to revise the platform.

4. CONCLUSIONS

The results of the first project stage will be used to build a concept for a web-based platform and to realize it within TPL during the rest of the projects period [TPL14]. The next months will be used to create target-group-specific e-learning content which should be used to support lessons during schooling and job training. Realising a digital and modern learning place is the main objective of the project TPL [TPL14]. The designed platform will consider the results of interviews made with vocational teachers and business companies so that the platform will be designed as practical as possible for all users.

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