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E-learning in engineering studies - experience of the Ilmenau University of Technology

Sabine Fincke[1], Heinz-Dietrich Wuttke[1],

[1]Ilmenau University of Technology, Germany

sabine.fincke@tu-ilmenau.de

Abstract: *The integration of e-learning elements and e-assessments in the learning and teaching scenarios is more than 10 years standard at the TU Ilmenau. This concerns in particular the engineering studies. The used materials and tools are developed in the past at different faculties and thus very heterogeneous in relation to technology, usage scenarios, and content. The pilot project "Basic Engineering School" provides opportunities for the further integration and development of the educational technologies used.*
This article describes approaches and methods to the further developments well as first experiences.

Keywords: *E-Learning, common engineering skills and basics, Basic Engineering School, Ilmenau University of Technology*

Introduction

Studying in the engineering courses (Bachelor and master) at the Ilmenau University of technology (IUT) is currently (still) oriented on face to face lectures. Unless that fact, the integration of e-learning and e-assessment elements in the learning and teaching scenarios has a more than 10 years tradition.
A number of integrated basic services - such as the deployment and central management of the learning management system (LMS) "moodle" with its specialized learning rooms- are provided by the computer center and thus a part of the Universities' infrastructure. In addition, a students' association named FEM e.V. (Research association of electronic media) [6] supports the digital course recording. In the past the used materials and tools were very heterogeneous in relation to technology, usage scenarios, and content.
The Internet portal www.bildungsportal-thueringen.de [1] with catalogs, newsletters and its collection of e-learnig materials) conveys an impression of the diversity of the used materials at the ITU. The largest part of the materials and tools was initiated and developed in the faculties and departments within the framework of national and international project activities. They are designed for a further common usage across the College and in cooperation with other Universities.
Currently the research and development tasks associated with the e-learning usage are focused on:

- Evaluation, quality assurance and further development regarding content, technology and organization,
- Investigations of special educational scenarios to support innovative teaching and learning in engineering education, for example in the framework of the project of Basic Engineering School [5],
- Further development of cooperation in national and international networks such as the e-content sharing network "edu-sharing.net" [7].

Aims of these activities are

- to increase the sustainable availability of relevant technologies and proven content, transparency about existing materials and best practise examples,
- to support the exchange of experiences, services and cooperation possibilities,
- to increase the flexibility in teaching and learning scenarios by offering a "media mix", adaptated to specific needs of special leraner groups,
- to encourage self learning competencies,
- to support an efficient organization of cross-College vocational international and national offers as well as
- to offer a collection of usecases for electronically supported assesment and feedback scenarios.

Methods

In the context of the "Basic Engineering School" of the IUT teaching and learning has been modified for special assembled groups of students, so called "model groups", during the first two semesters. Goal of these modifications was to increase the study motivation and studying ability by introducing a teaching and learning model, which is more interdisciplinary and application-oriented and flexible. The following illustration shows the practice and application-oriented teaching model.

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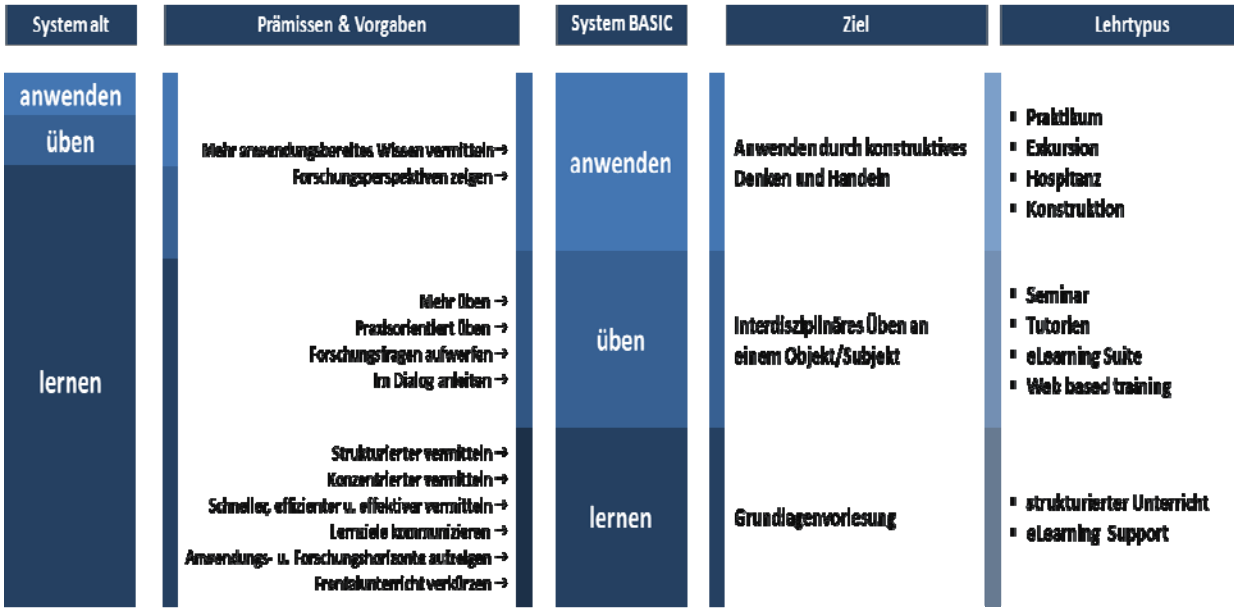

Figure 1: Practice and application-oriented teaching model in the "Basic Engineering School"

The concept of the "Basic Engineering School" includes a step by step introduction of e-learning components to support the students' competencies in a self organized learning style.

Therefor the followings steps characterize the method:

1. Research and analysis of currently used materials and tools, collecting best practise experiences,
2. Structured overview about the engineering study courses, participating in the project "Basic Engineering School", on the basis of available reports,
3. SWOT analysis of the materials and the actual situation at the IUT to define development requirements for different target groups,
4. Development, testing and evaluation of specific scenarios and instruments such as simulations, remote labs, e-assessments, adaptive learning environments, cross-curricular teaching, learning diaries, and repositories.

Results

Currently, steps 1 and 2 are work in progess. The results of these steps will be available at the beginning of July 2013. On this basis, special projects for model groups of the 2013/14 beginners will be prepared.

The contribution will focus on the current status of work and reflect the experiences made until September 2013.

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