REMEDIAL SCENARIOS FOR ONLINE AND BLENDED-LEARNING BRIDGING COURSES

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The European Project Math-Bridge [1] aims at providing technical and pedagogical support for mathematical bridging courses. Based on the ITS ActiveMath [2], Math-Bridge (MB) extends it to the project's special needs. MB provides amongst others pedagogical remedial scenarios which enable teachers and learners to use MB for different course scenarios. This poster will present these remedial scenarios.

Keywords: Bridging Courses, Remedial Scenarios, Self-Regulated Learning

THE LEARNING MATERIAL IN MATH-BRIDGE

Most of the project European partners already have experience with the development and implementation of math bridging courses and provide a big amount of learning material for reuse within MB. This material needs to be enriched by pedagogical and mathematic-structural metadata. Our pedagogical structure (Biehler *et al*., 2009) bases on existing competency models like PISA (OECD, 2003) and the German Bildungsstandards (KMK, 2003) and defines four competency clusters on the 1st dimension: technical, math problem solving, modelling, and communication and reasoning. Our 2nd dimension contains three achievement levels: reproduction, connection, and reflection. Our math structure is defined in an ontology which bases on the taxonomy for Mathematical Sciences Education [3].

THE USE OF LEARNING OBJECTS IN MATH-BRIDGE

In order to use the enriched content within the adaptive learning system, we extended the pedagogical scenarios of ActiveMath (Reiss *et al*., 2005) to the purposes of math bridging courses. These scenarios aim at different learning goals (rehearse, workbook…) and select the most reasonable learning objects (LO) with regard to students' abilities and learning goals, bring them into a predefined order and hence give them an appropriate learning environment for their individual purposes.

An analysis of the learning material showed that some of the sequences of atomic LOs are not freely exchangeable and instead belong strictly together. These sequences should not be broken up since e.g. an "introduction" sometimes forms a holistic unit. Having the individual LOs and also keeping these units together, we introduced a new structure element called "complex learning objects" (CLOs). According to the learning material from the VEMA-project [4] (Biehler *et al*., in press), we identified the following types of CLO: Introduction, Info/Interpretation/ Explanation (IIE), Application, Misconception, Practice, and Supplement (Biehler *et al*., 2010).

FORMALIZED REMEDIAL SCENARIOS

For the remedial scenarios concerning the CLOs we developed a close order of units (overview, intro, info, IIE, application, typical mistakes, exercises, and supplement), where the learners can select relevant units for their learning process. To support the students in structuring their learning, MB provides scenarios with preselected units, e.g. Select Basic (overview, info, IIE, exercises) (Biehler *et al.*, 2010). Hence the students can create a book respecting their needs and pedagogical principles.

THE LEARNING ADVICE COMPONENT

Most of the first-year students are not trained in self-regulated learning especially in ITS. We thus designed a self-assessment component: After having chosen a specific domain the learners get an overview of the topics and the relevant definitions and theorems. Then they estimate their knowledge and assess themselves using a diagnostic test providing feedback on their performance and abilities. Finally they compare their own solution to a model one and the assessment results with their initial self-estimation. With this feedback, the learners are able to select content and learning scenarios adequately. Besides the learning advice component trains the student's ability of self-estimation and self-regulation (Biehler *et al*., 2010).

NOTES

1. http://www.math-bridge.org
2. http://www.activemath.org
3. http://people.uncw.edu/hermanr/mathtax/
4. http://www.mathematik.uni-kassel.de/vorkurs

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