LEARNING MANAGEMENT SYSTEM IVA

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IVA is a Web-based learning management system, which is developed in Tallinn Pedagogical University (Centre for Educational Technology and Department of Computer Science) in order to advocate constructivist approaches and practices in e-learning.

We have tested and tried to implement various commercial and free learning management systems in our university in previous years. We started using WebCT in 1998 but due to important rise of licence fees we had to move on to more affordable solutions. In last few years many new learning management systems have become available. Often these programs include more pedagogical innovation than commercial products that have been in the market since mid-90's. Unfortunately there was no free learning management system that would cover the full functionalities needed by the university. Also most of the tested learning management systems had important usability problems and were difficult to learn (Põldoja and Laanpere 2002).

In autumn 2001 it was decided to develop our own e-learning platform. The project started in summer 2002 with the financial support from the Estonian Ministry of Education and Science. We decided than we are going to build learning management system using available open source products and release our product under GPL license. Zope-based learning management system FLE3 which is developed in Helsinki University of Art and Design seemed to be the most suitable starting point for us.

IVA is a metaphor in Estonian language and means "a seed" (also "point" or "meaning"). In 1817, reverend Otto Reinhold von Holtz published a series of moralist stories for Estonian peasants under a slogan "story is a shell, meaning is a seed". Since then this slogan has been widely used among teachers and teacher educators in Estonia, when they want to stress the importance of looking deeper below the surface in order to understand better the meaning, or "the point" of phenomena. On another hand it could be read as an acronym, but we are still uncertain if it is Interactive Virtual Academy or *Ilus Vaba Asjalik* (in Estonian: beautiful, free, useful).

As opposed to many commercial Learning Management Systems, IVA is not "pedagogically neutral". The structure and functionalities of IVA system advocate constructivist approaches to learning and teaching. For constructivists, learning is not merely transmission of objective knowledge - each learner constructs actively his/her own "picture of the world", associating new meanings with previous experiences and communicating with others. According to D.H. Jonassen (1994) , the three most important conceptual pillars for designing a truly constructivist learning environment are three C-s:

- Meaningful and authentic Context for learning,
- Tools, support, time and space for personal knowledge Construction
- Support for Collaboration and group reflection and production.

Referring to these three pillars, we designed IVA user interface in three sections (Laanpere et al 2003):

- Bookshelf, a space and tools for providing context for meaningful learning
- Webtop, a space and tools for personal knowledge construction and reflection
- Workshops, a space and tools for student collaboration and group communication.

Webtop is divided to two sections which are public Portfolio and private Drawer. These sections can hold such objects as files, web links and simple text documents (memos). All the forementioned objects can be grouped into folders. At the end of the course portfolio will include all documents and presentations made by the student during the course. This way it can be a major part of assessment. In the Drawer each student can access his or her activity monitoring data, quiz results and course grades.

Webtop also includes simple textbased content management system Wiki which can be used to produce hypertext documents inside IVA environment. Wiki is based on powerful yet simple concept that allows everyday users to create and edit every page in a Wiki site. A good example of what can be done with Wiki is Wikipedia – free online encyclopedia which can be edited and updated by every visitor (see www.wikipedia.org).

Bookshelf has basically the same functionalities as Webtop but it is designed for course materials prepared by the teacher. Under the Bookshelf section students can also access course information page. No objects in Bookshelf can be edited by students and therefore Bookshelf does not include Wiki.

The most interesting and innovative part of IVA is Workshops section which offers different tools for computer supported collaborative learing. Some of the tools like Knowledge Building and Jamming are inheritated from FLE3, others like Subgroups and Quiz are developed by us.

Knowledge building is a structured discussion environment. Teacher can add a context (description of a problem) and there is a separated threaded discussion under each course context. Knowledge building discussions are also organised by thinking types – each author have to choose a thinking type which best describes his or her note (see Figure 1). By default there are two thinking type sets included with IVA. *Design thinking types* support the process of making design decicions in web based discussion environment while *progressive inquiry* is a good tool for developing students own theories (Leinonen et al 2002). Each note may include a picture and a hyperlink.

Jamming is a tool for collaborative construction and versioning of digital media objects. All students can make a new version of a media file and upload it to IVA environment. The inheritage of objects is shown graphically and all objects can be commented by other students.

There is a course Wiki under the Workshops section which can be used by all members of the course. For group work we developed subgroups which are closed areas for sharing Webtop objects between members of a group. All webtop items except Wiki are possible in Subgroup.

In Estonian universities there is a strong need for testing tool in learning management system although automatic quizzes are not the best assessment method according to the social constructivist learning theory behind IVA. Therefore we have developed quiz tool for IVA. The question types include all the question and tests interoperability standards compatible question types such as matching, multiple choice, numerical, mark all correct, yes/no, paragraph and short answer. Besides that we have added automatic question generation engine, which can be used in chemistry for solving percentage calculation exercises (e.g. solution strength). In the future we are planning to add more question generation engines such

as kinematic problems in Physics. This kind of engines are unique and can not be found in any other learning management system we have encountered yet.

IVA is currently used in Tallinn Pedagogical University, Linz Pedagogical Academy (Austria), European doctoral summer school and several schools in Estonia. IVA is currently available with English, German and Estonian user interface. Finnish, Russian and Portuguese localizations are under work and should be available by the end of year 2003.

IVA is a true open source software project and we are looking forward to establish a wider community of programmers and users who would help us to develop new features, looks, translations and knowledge types for IVA. For more information about IVA learning management system you should visit our website: http://www.htk.tpu.ee/iva/.

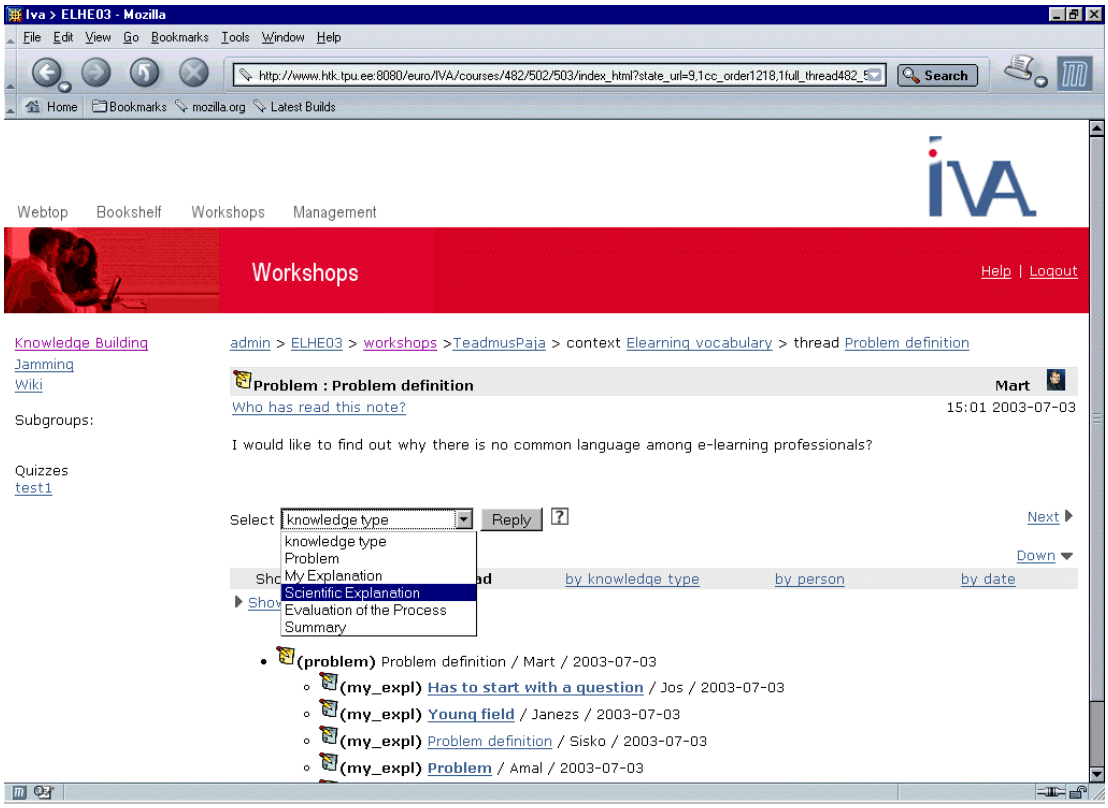

Figure 1. Choosing a thinking type for a message in Knowledge Building forum.

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