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# **E-LEARNING DEVELOPMENT ENVIRONMENT JTAP – NEW APPROACHES TO E-LEARNING CONTENT CREATION**

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## **Introduction**

The technical infrastructure for highly productive training over the internet is available. Nevertheless, content creation is still difficult if one wants to implement multimedia material with interactive parts that is beyond simple test forms. Students of the University of Applied Sciences in Wedel, Germany, have developed an innovative system to make content creation easier. Based on its Open Source licence, the platform-independent software is available for free for anyone to use.

## **E-Learning Material Today**

The combination of computer-based training and the universal communication capabilities of the Internet has made a wide range of new eLearning applications available today. The successful merging of these two technologies can now be utilized for a variety of different, highly productive training functions including online lectures, documentary videos, simulations, virtual experiments, case studies and game-based learning. In most cases today, notwithstanding this large array of technologically-viable options, we still find simple texts and scripts only. This material, sometimes even missing a hypertextual structure, is offered under the limited capabilities of a browser-based program. Using a metaphor this is somewhat like having the technology for printing four-coloured books but using stamps to write the book content instead.

In addition, most of today's authoring tools are still limited to simple testing options like multiple choice, drag-and-drop and similar basic types. Originated in the narrowly-focused and fairly restrictive ideas of 1960's academics, this kind of training is not an invention of eLearning. But this concept of non-interactive "programmed learning" has failed time and time again, because of boring those trying to learn as well as limiting learning and testing strictly to the lower level of cognitive skills.

The gaps we have indicated above lie, fundamentally, between the methods of content delivery and content creation and have existed for quite some time. A group of students has recently developed an authoring software that they believe successfully bridges these gaps. The software is called "jtap": Java Teach And Present.

## **Four Level of Content Creation**

With jtap, they have introduced a four level-model of content creation. In this model, you can create virtual slides and arrange them to different curriculum types. Each of these virtual slides may contain static, dynamic and interactive elements. The model takes the different technical skills of trainers into account. Most trainers start on the easiest level by using standard elements (text, graphic, video, animation, sound, standard assessment) in a WYSIWYG editor. These elements can be either static (text, graphic objects, html documents), dynamic (keyframe animation, video, sound) or interactive on a low degree (smart answer fields, paint areas, multiple choice tests).

Without any previous knowledge of the software, trainers can construct the slides on a virtual white board. Each slide will be organized in a multi-layered timeline. The multi-layer concept allows the combined projection of more than one slide on the board. This means one can have as many background, foreground, chapter and content layers as he wants. For example you can place a table of content element in a foreground layer that is visible during the complete course whereas the content changes on a different layer each time you navigate to a different page. In addition you can use chapter layers containing one slide for each learning episode. The table of content element can be generated automatically. Several alternatives for navigating through the course are supported. For a student's orientation there are many possibilities to indicate the current progress of the course.

Students have the opportunity to define their own preferred structure of the content. On each slide they can write down their notes and drawings. Beside the core information you can insert links to additional learning material on a slide. The material will be available within a jtap course for students that want further insights or need more detailed explanations.

The second level allows the elements to interact with each other by selecting simple actions. You can define a list of actions for different events. By clicking on a picture for example, you can show or hide other elements, change their size, color or position and start other media resources (video, animation) within the same slide.

The third level offers a simple script language (Tool Command Language, TCL) to allow the addition of real functionality to each slide. This is useful for any type of calculation, controlling and automation of processes. The response to test evaluations or mouse events can be defined in small scripts. A script allows the introduction of new conditions for tests, e.g. entry levels, exit or question path instructions. Simple programs can be created in an EasyScript mode by adding actions to a command list using drag&drop. Special actions allow the implementation of animation effects in a single line of code. The script language supports regular expression, string operations, lists, condition statements and several control structures.

On the fourth and highest level one can optionally write new element types by using a programming language such as Java. This allows the full integration of complex simulations and experiments. Using an object oriented language in combination with the powerful infrastructure of jtap will significantly reduce the time necessary for development. The developer can concentrate on logical processes while using the graphic environment of jtap to visualize the results.

All levels can be combined and imply the suitability for each learning paradigm. Standard elements can support the learning processes for base knowledge in a traditional way. Simulations, virtual experiments, case studies and game-based learning can be implemented by using a script language or an object oriented programming language. Real interactivity in a virtual world will always require some program development. Trainers can concentrate on the content while the production of sophisticated interactive elements can be outsourced.

### **Support for Collaborative Distance Learning**

Courses created with jtap can run in a stand-alone environment or can be synchronized on a large number of computers in a fully collaborative environment. A group of students can navigate together through a course - each of the group's members from a different physical location in the world. All students see the same slide at the same time. In addition they can manipulate the elements of a slide. The changes will be broadcast to all other students. As a result the slides can be used as a common working space for the students. jtap knows a role concept that differs between the master teacher, assistants and students. The master starts a learning session and is allowed to control it.

For each layer of the timeline it is possible to assign a scope:

- public layers
- group layers
- private layers
- master layers

Public layers are visible for all participants of a learning session. However like whiteboards in a real classroom public layers are only accessible by the master. He has the chance to temporarily transfer rights for writing and manipulating to one of his students.

While public layers are fully synchronized between all participants, group layers are not. Students can be assigned to a learning group and each group has its own set of group layers. These are only synchronized within a group. The analogy to a classroom are documents commonly worked on by all group members. These can be used to record the results of a group work.

Private layers are only used by a single student. Everything the student is doing on that layer is of his own business, invisible to the rest of the learning group. In a real classroom situation that would be the private notepad of the student.

Assignments can be arranged in different working modes now. A certain amount of time can be given to each student to solve a problem for example. He will work on that task in his private layer. After a while he will present his results to his group in the group layer. At the end of a lesson the group summary can be packed into one of the public layers to share the ideas with all students. The master will transfer the writing permission to one group at a time.

Master and assistant(s) do not belong to a certain group, but they can join any group temporarily to support its members. If that happens, they behave like normal group members and share the synchronized view of the group layers. Private layers can also be shared between a student and the master, if the student invites the master.

### **Learning - Anywhere at Anytime for Anyone?**

Courses that are created with jtap can be taken on any computer platform. jtap was developed in Java and runs on Windows, Linux and Macintosh. Students are free to choose their system and no one will be excluded. In the future jtap is going to run on set top boxes and portable devices. Then the expression “learn anywhere at anytime” is not only a phrase but will gain more significance.

Since jtap is free available for anyone, not only professionals but students can transfer traditional learning material into multimedia content. The cost efficient production of eLearning units is one of the intentions of jtap. The created courses can be exchanged world wide and easily adapted to the specific needs of a concrete lecture. The reuse of materials is made as simple as possible.

The eLearning development environment was created at Wedel University during the last two years to meet the requirements for virtual learning material. Many eLearning activities are established at this university for a long time. All student assignments are supported by newsgroups, lecture scripts are provided by handout servers and the administration of exams is web based. There is an intensively used campus information system providing daily updated information. A campus radio is broadcasting exclusive news on the intranet. The next step is developing interactive course material that is provided in addition to lectures. The system offers an explorative and collaborative environment to all students.

### **References**

<http://www.jtap.org>  
<http://www.kohls.de/seminar/index.html>

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