

Accessible Technology for Networked Learning

A Symposium Proposal for the Networked Learning Conference Sheffield University in March 2002

Submitted by Prof. Chris Jesshope

The aim of this symposium will be to present a range of tools that have been developed for on-line learning, to disseminate awareness of their use and to receive feedback from the delegates on the further development of these tools through on-going research. The various functions of an e-learning system usually have the following tools (<http://www.outreach.utk.edu/weblearning/>. retrieved on Dec 8, 2001. Robert H. Jackson, 2001):

1. *Authoring Tools* - essentially, multimedia creation tools
2. *Course Management Systems* (CMS) - generally comprises a content manager, asynchronous collaboration tools, and learning record-keeper.
3. *Educational Delivery Systems* - a software product or suite that facilitates the delivery of content or interaction by the web,
4. *Learning Management Systems* (LMS) - a software product that provides learners an integrated view of all their active coursework and assignments in a "syllabus" that spans multiple courses and that provides comprehensive assessment and goals tracking spanning multiple courses
5. *Learning Content Management Systems* (LCMS) - A relatively new category with basic characteristics of a standard Learning Management System (LMS), but enhanced with strong, integrated authoring tools and the capabilities of a knowledge management system.

The tools that will be presented are the result of six years of collaborative research undertaken by Massey University in New Zealand and, at various times, the University of Surrey, the University of Hertfordshire and Hull University in the UK. The main goal of this collaboration has been to develop easy-to-use tools for on-line learning. In other words to enable the teachers, rather than to produce tools for the media experts. The first is the TILE framework, a flexible learning content management system that allows monitoring and adaptive delivery of content in both on- and off-line modes. The AudioGraph, a multimedia authoring tool that adopts a novel and simplifying paradigm for multimedia content production, which can produce sophisticated and interactive presentations. Challenge, another authoring tool, which allows teachers to build "Goal-Based Scenarios" that present the student with a real-world problem that they need to evaluate and solve. Examples of the use of two of these tools in University teaching will also be given.

The symposium will also present longer-term research for, and application of, the above tools. The aim of this feedback and research is in improving and enhancing the effectiveness of the above tools. The new directions being investigated takes on-line learning beyond the mere delivery of multimedia documents. Innovative tools are required that exploit multimedia technology to enrich the current forms of computer-based communication to mirror more closely the way humans interact face-to-face and to provide a richer environment that allows cross-referencing between documents of various media types. Further details of are given in the abstracts of each presentation.

Professor Jesshope, Hull University (c.r.jesshope@dcs.hull.ac.uk) will chair the symposium and further presentations will be given by the following:

Dr Eva Heinrich, Senior Lecturer, Massey University
(E.Heinrich@massey.ac.nz)

Professor Alex Shafarenko, Hertfordshire University
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Dr Terry Stewart, Senior Lecturer, Massey University
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Dr Jenny Zhang, Technical Coordinator of the TILE project, Massey University
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The Symposium will require two hours.

CONTRIBUTION TO SYMPOSIUM ON:

Accessible technology for Networked learning

TITLE OF PAPER:

Interactive Multimedia for Dummies

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INSTITUTION:

Hull University

SESSION TYPE:

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FIVE KEY WORDS: Multimedia, Authoring, Easy-to-use, Streaming,
Committed choice

Interactive Multimedia for Dummies

This paper will describe some significant enhancements to a multimedia authoring tool that has been developed for use by the lecturers and teachers (Gehne and Jesshope 2001). The tool uses a novel paradigm that eliminates time and hence synchronisation in the development and editing of multimedia documents. Instead it uses the notion of a strict sequence of media elements. The media is packaged and compressed and is delivered by browser plug-in to users. The media can be streamed over low-bandwidth modems making it suitable for delivery in any environment.

The existing tool is in use by over 1000 users in education both at the school and university level. Papers have been published on the use of this tool for both internal and extramural or on-line teaching (Jesshope2000). Feedback from users directed us to improve several aspects of the tool. The two areas where we had most feedback were:

- the development of interactive media – the existing tool produces linear presentations which are rather like a video on playback
- the incorporation of a richer set of media elements, in particular music quality audio and the lossy compression of photographic images – the existing tool currently supports only speech quality audio (GSM) and lossless images (PNG).

The latter is relatively easy to implement and we will include a variety of new media types in the second version of this authoring tool. In particular we will support JPG as well and PNG images and will support a variable-rate, music-quality sound compressor, using the open standard Ogg Vorbis. Developing interactive media presentations, on the other hand, provided more of a challenge. The constraints we had to meet were that we wished to maintain the streaming property of our presentations, in the presence of user choice. Moreover we wanted to maintain the ease of use of the tools.

The paper will discuss the choices made in our design, for example, in retaining the strict sequence of media elements within an episode of a presentation and providing choice as hyperlinks between episodes. It will discuss the user interfaces and the presentation of the now more complex multimedia presentation and it will demonstrate the use of the tools and give examples of the new pedagogical techniques that can be used with the new tool.

References

R. Gehne and C. R. Jesshope (2000) Tools for the production of small-footprint, low-bandwidth, streaming multi-media for distance education, *Proc Lifelong Learning Conference*, Central University of Queensland (Brisbane, Australia), ISBN 187 6674 06 7, pp240-244.

C. R. Jesshope (2000) The use of multi-media in internal and extramural teaching, *Proc Lifelong Learning Conference*, Central University of Queensland (Brisbane, Australia), ISBN 187 6674 06 7, pp257-262.

CONTRIBUTION TO SYMPOSIUM ON:

Accessible technology for Networked learning

TITLE OF PAPER:

Beyond Just Replay: Multimedia Support for Online Learning

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INSTITUTION:

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SESSION TYPE:

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FIVE KEY WORDS: **On-line learning, Multi-modal description, Content delivery, Structured interactive communication.**

Beyond Just Replay: Multimedia Support for Online Learning

Current systems for the support of online learning (e.g., WebCT, 2001; BlackBoard, 2001) focus primarily on the delivery of learning material and on administrative tasks like the management of enrolment, assessment and course data. These systems contain some degree of multimedia capability by allowing course designers to make learning material of different media types (text, video, audio, ...) available to students. The proposal presented here makes the claim that multimedia technology could be used far more effectively to support online learning. To take online learning beyond the mere delivery of multimedia documents innovative tools are required that exploit multimedia technology in pedagogically valuable ways.

There are two main areas where multimedia could be used to enhance online learning:

- to enrich the current forms of computer-based communication to mirror more closely the way humans interact face-to-face;
- to provide a richer environment that allows cross-referencing between documents of various media types.

Human communication contains many facets of exchanging information. In face-to-face situations people converse via spoken language and supplement their dialogue with gestures, intonation or facial expressions. Discussions will often be centred around documents. These documents might be presented in printed form, as projections, video or audio recordings. The content of the documents might be displayed as text, images, graphs, sounds or spoken words. People include these documents into their communication by pointing at specific sections, by highlighting areas or by possibly repeating the replay of important parts. These few points indicate the richness of human communication that not only centres around 'multimedia' documents, but very importantly integrates multiple formats of information exchange. Current computer-based communication reduces this richness down to the exchange of textual information.

Successful teaching draws on multiple sources of information and encourages students to make connections across material. While it is easy to present multiple documents (e.g. the original text version of a play, a video recording of a performance of the play, a text or possibly audio document giving the interpretation by a well-known critic, etc.), in today's online learning environments there is no way to cross-reference between the segments of the various documents (e.g., to highlight scenes in the play that have undergone modifications from original text). With the help of multimedia technology and the right description techniques, tools can be developed that allow the interconnection of documents. Depending on the learning environments these tools could be used both by teachers delivering material and by students participating in active learning. Descriptions and cross references established can be stored in a database to form a knowledge resource creating a layer on top of the separate documents of learning material.

Within the TILE (2001) project we are developing an application platform, called the Multi-Modal Description Framework (MMDF; Heinrich and Chen, 2001), that provides the basis for the implementation of innovative multimedia tools for enriched communication and cross referencing as outlined above. The main features of MMDF are:

- Access to documents of multiple media types for position- and time-based segmentation;
- Multiple modes of description (text-, audio- and graphics-based) for the description of document segments;
- Multi-user environment with user groups and layered access rights;
- Storage of description, segmentation and user information grouped into sets in a relational database.

Based on MMDF innovative multimedia tools are currently being specified.

References

- Blackboard (2001). <http://www.blackboard.com>; accessed 07/12/2001.
- Heinrich, E., Chen, J. (2001). A Framework for the Multi-modal Description of Learning Objects. Proceedings of International Conference on Dublin Core and Metadata Applications 2001. Keizo Oyama and Hironobu Gotoda (Eds.), pp 32-37. Tokyo, Japan.
- TILE (2001). <http://www-tile.massey.ac.nz>; accessed 07/12/2001.
- WebCT (2001). <http://www.webct.com>; accessed 07/12/2001.

CONTRIBUTION TO SYMPOSIUM ON:

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TITLE OF PAPER:

E-learning Content Management Tool

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FIVE KEY WORDS: E-learning, Content management, Authoring, Versioning, Reuse

E-learning Content Management Tool

This paper will describe the TILE framework, which comprises a learning content management system and an educational delivery system. This paper will focus on the former as the latter has already been described elsewhere (Gehne, Zhang and Jesshope, 2001). From the pedagogical point of view, content creation and delivery are the two key factors in web-based learning systems. When supported by the Internet, content delivery are relatively cheap. But creating high quality online learning content is very expensive. Currently different organizations are creating similar content for their own need, with little reuse of content. This is a waste of valuable resources and is the reason why there is an imperative need for content management system to facilitate content development and deployment. E-learning content management systems face the challenge of collecting, organizing, managing, maintaining, re-using, delivering and targeting the content. (Harvi Singh,2001)

Authoring tools are used by teachers or developers to create content, which may be animations, graphics, text, audio, video or other multimedia segments. This material is then organized into learning objects (Harvi Singh,2001). In order to reach the educational goal, learning objects have to be organized into units of study. That unit of study usually has structure, which may include hierarchy and precedence. An LCMS should support the management of any content level, which includes multimedia segments, learning objects or units of study.

The TILE system supports the following:

1. allows the author to create multimedia segments, learning object or content structure locally in an open environment;
2. has a centralized repository to organize content structure and content materials and provides version control and maintain a history of multi-version contents;
3. imposes authorization on any level of content structure for modification, where only an authorized user can update the content;
4. allows intellectual property protection as the content author is able to decide who can check out the content;
5. enables collaboration by allowing multiple-authors to work on one unit of study synchronously and then merge their work into one structure notifying authors if there are any changes;
6. supports communication between authors and reviewers;
7. content structure and content can be labeled and then be searched by other users;
8. content structure and the contents itself can be shared, re-used or modified by other authorized users;
9. uses various content packing standards for content delivery and sharing importing or exporting content, as defined by

- IMS(Instructional Management System) content packaging(IMS,2001) and ADL's Sharable Courseware Object Reference Model(SCORM,2001);
- 10.separates content management and content delivery repository with contents being published from one to the other;
 - 11.global accessibility via internet without any restriction from firewalls.

References

Harvi Singh (2001).

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