Provost's Learning Innovations Grant

Project Title
Authoring Tools for Creating Web-Based Courseware Using a Hybrid Streaming Video Format

Applicant
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College: NTID

Project Summary
The project goal is to create a suite of authoring tools for developing courseware using a hybrid instructional format combining dynamic Web contents synchronized with streaming video to support classroom and lab-based instruction. The project also has potential application for distance learning.

Who Are the Targeted Learners?
At inception, the project will focus on the needs of deaf learners at NTID. These learners typically possess weak reading and writing skills. As a result, they often benefit from visually oriented multimedia instructional materials.

However, the proposed tools have wider application and can be used to create similar courseware in diverse disciplines for hearing students at RIT and beyond. If the project demonstrates that the concept is a viable one, I plan to seek external funding to develop the tools as an application for creating courseware for both deaf and mainstream learners.

Anticipated Impact on Teaching and/or Learning
The project will develop programming tools to control the actions of streaming media players embedded as ActiveX objects or components in Web pages. The embedded components will add a video and audio dimension to traditional Web pages.

A captioning tool will allow the embedded video to be marked and will generate SAMI (Synchronized Accessible Media Interchange) code for adding closed captions to the video for the benefit of deaf learners who cannot hear the audio. A graphical timeline tool will allow instructors to control and synchronize streaming video and audio (and closed captions) with dynamic Web content.

The application will utilize the timeline information to generate needed HTML+TIME (Timed Interactive Multimedia Extensions) code to add timing and media synchronization support to HTML pages. Thus, users need not be proficient in Web scripting or programming in order to create interactive and multimedia-enabled presentations for Web-based delivery to students individually, in classrooms and/or in laboratories.

The proposed hybrid media format will make it possible to create Web-based instruction with multimedia and interactive functionality approaching that of CD-ROM courseware. Learners will have a large degree of control over how they interact with this instructional format. They can selectively jump to specific segments, bypassing information they do not need or that they already know. They can easily repeat previously viewed segments to reinforce learning.
For instructors, a programmable interface will allow them to use streaming video with course management tools. For example, an instructor can create a pop-up quiz, synchronizing it with a video segment. Based on a student's responses to the quiz after watching the segment, the system can take one of several programmed actions: allow the student to continue to the next segment, require the student to review the same segment again, or present the student with remedial information and further practice.

The project tools will enable instructors to create Web-based courseware with rich multimedia and interactive capabilities. Existing Web-based instruction can be re-purposed and re-packaged as multimedia-enhanced courseware. Instructors working with text-based course management systems will be able to take advantage of media synchronization to create interactive video presentations with embedded evaluation items. The easy-to-use captioning tool will open the way for greater use of streaming video for teaching deaf learners. Deaf educators have long recognized that these learners, who form a large cohort of the RIT student population, tend to benefit from instructional materials that include a larger proportion of visual information.

How You Will Measure the Impact
Project impact will be measured on several levels:

1. Evaluation data will be collected from faculty users to determine the extent to which they find that:
   a. The tools are useful and easy to use
   b. The hybrid streaming video format helps them to teach more effectively.
   c. The hybrid streaming video format improves student learning

2. Students taking courses created in the hybrid streaming video format will be surveyed to determine learner satisfaction, and the extent to which they feel the format helps them to learn better as compared with traditional instructional materials.

How You Will Report Your Findings
I will give two local presentations, one before the NTID community and another before the RIT community at large.

I also plan to present a paper on my project at a national conference to be decided later.

What You Will Share About Your Project in a Faculty Forum
I will make the proposed tools available online for any interested RIT faculty or instructional developer to make use of. As part of my duties as an instructional developer at NTID, I plan to work with a group of NTID professors to create new and/or re-develop existing Web-based course materials using the hybrid streaming video format. We will make our courses available to serve as models for other faculty who wish to develop similar courseware.

Present a Rationale for Your Project, As It Ties to the Intent of the Grant
This project is a substantial undertaking, requiring considerable human and financial resources. It is also experimental, both in terms of creating the tools in a form suitable for deployment as a Web application, and potential impact of an instructional format combining streaming video with dynamic Web content. My department and college only allocate funds for production projects,
not for development projects of an experimental nature. The proposed project is thus a logical candidate for a Provost’s Learning Innovations Grant. I hope the grant committee will give it due consideration.

Relevance to Deaf Learners at NTID
Deaf learners at NTID typically possess weak reading and writing skills. As mature learners they need information to be presented in a way that they can comprehend, yet sophisticated enough to challenge their level of maturity. Deaf educators have long recognized that these learners benefit from instructional materials structured to include a larger proportion of visual information. An instructional format combining streaming video synchronized with dynamic Web content appears to fit the needs of these learners.

Relevance to RIT and Mainstream Learners
Video presentations and demos are ideal for delivering lab-based instruction, especially courses aimed at teaching procedural learning, such as graphics design and software applications. The proposed tools have potential as an instructional development tool for creating courseware in, say, many of our New Media courses.

Describe How This Innovation Is In Your Discipline or Program
I am a deaf Instructional Developer (EDF) working in the Department of Instructional Development and Evaluation at NTID. I graduated from Gallaudet University in fall, 1992, after earning an MS in Educational Technology (Special Education/Deafness). I started working at RIT soon after and have been working here since.

The focus of my work at NTID is to develop instructional solutions to meet the need of many of our deaf learners for visually oriented instruction. Over the past 5 years I created a number Web sites that incorporate rich media, such as Shockwave animation and Web video, with online course management functionality implemented using ASP technology. These Web sites are being used at NTID to teach courses in diverse content areas, including Web design, C++ programming, Visual Basic programming, Astronomy, Meteorology, Social Studies, Reading, and English Composition.

My current interest is to create Web tools for Web-based instructional development and evaluation. I am also interested in the Web as a medium for distance learning. I was awarded a 1999 Provost’s Productivity Grant to develop a suite of rapid development tools for building Web courses. These tools have since evolved into IdeaTools, a combined Web authoring and course management system used by many NTID faculty to create interactive and multimedia-enabled Web sites to support classroom instruction and distance learning. I was also awarded a 2000 Provost’s Learning Innovations Grant to create Virtual Classroom, a client-server platform capable of supporting online teaching and tutoring in real time. This technology is currently being incorporated into a new project called Web-based Reading/Writing Center. This project, a collaboration between me and Rose Marie Toscano in Liberal Arts College, is supported by a New York State VATEA grant.
Provide a timetable of the Development of the Project

Summer 2002 : Design tool specifications; building/evaluating prototype components
Fall, Winter 2002 : Developing/testing tool components; integrating tool components
Spring 2002 : Tools deployment; project previews/collectiong feedback; refining tools

Comparison With Available Tools
While developing this proposal, I contacted Steve Wunrow in ETC. Steve referred me to Jeremiah Parry-Hill, with whom I exchanged e-mails. I also interviewed Jim Mallory, an NTID professor in the Applied Computer Technology department. Jim had just completed a project funded by a New York State VATEA grant. As part of the project, Jim installed a streaming video server and created a series of streaming video presentations to teach a beginning Visual Basic programming course to deaf learners. The course was offered both on-campus and in distance learning format. My comments below are based my interview with Jim.

Both Jim and I agreed that a big shortcoming of the RealMedia streaming video technology is more a generic platform than an application. In Jim's experience, it lacked tools for instructional development purposes. For example, Jim could not find any tools to synchronize RealMedia's streaming video with dynamic Web content. Jim had wanted to combine his video with his Web contents, divide his video lessons into segments, and provide buttons that will pop-up explanatory notes in DHTML format, with an option for students to view the relevant video information or by-pass it. Jim was unable to achieve this with the RealMedia tools. Also, instead of accompanying his video with closed captions created using the Web-based SAMI format, he had to embed his captions directly in the video stream. This means that he cannot modify or update those captions unless he re-create the videos all over, a time-consuming and expensive proposition.

The tools that I propose to develop would overcome both of these limitations. Users would be able to embed video directly in the Web page and then create interactive presentations and demos by controlling video playback by means of elements on the Web page. Video playback can be synchronized with additional dynamic Web contents (e.g., "flip charts" to accompany a video lesson or a pop-up quiz at the end of a lesson). Such Web contents have the benefit of being editable, so that Web-based course information can be easily updated. By creating the closed captions as SAMI files (an XML-based technology), they are also rendered easily editable, unlike captions "burned" directly into the video.

Amount Requested

Salaries for freelance programmer:
$18.50/hr x 20 hrs/wk x 12 wks x 4 = $17,760

Simon Ting, Dept. of Instructional Development & Evaluation

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Funds can be used for release time, student workers, and for purchasing supplies and services (such as CD pressing, video production, digitizing, photography). Funds will generally not be available for activities consistent with normal college business, doctoral research, equipment purchase or travel (though the latter will be considered if a clear connection can be demonstrated between the project and a given conference or workshop).

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<tr>
<th>Start and End Date</th>
<th>Total Amount</th>
<th>Budget Officer Verification</th>
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<tr>
<td><strong>SALARIES:</strong></td>
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<tr>
<td>Faculty Compensation:</td>
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<td>(College guidelines for adjunct teaching pay-scale should be used.)</td>
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<td>If you are requesting adjunct faculty money, include 8% of the salary dollars requested to cover the associated benefits.</td>
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<td>If you or another full-time faculty or staff member will be paid from the grant, the rate is 22.8% for benefits.</td>
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<td>Student Assistants:</td>
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<td>There are no benefits for graduate assistants or student workers.</td>
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<td>Other: (Professional services, consultant, staff support)</td>
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<td><strong>SALARIES TOTAL</strong></td>
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**MATERIALS:**

Give kind, quantity, cost:

| **MATERIALS TOTAL** | $ | |

**SERVICES:**

Attach appropriate estimates.

| Educational Technology Center: | | |
| Other: (Describe) | | |

| **SERVICES TOTAL** | $ | |

| **TOTAL BUDGET REQUEST** | 17,760 | |

**COLLEGE SUPPORT:**

Support provided by college in addition to grant request, if applicable.

(Explain)