NEW

Network EducationWare

Winner Best Software System
First International Competition for Non-Commercial
Web-Based Education

J. Mark Pullen and Priscilla McAndrews
Department of Computer Science and C^4I Center
George Mason University
Fairfax, VA 22030
{mpullen, pmcandre}@netlab.gmu.edu

Goals of NEW

1. Maximize accessibility of live classes over
   the Internet while preserving interaction
   - Usable with 56K modem or better connection
   - Remote student receives same voice and
     graphic as classroom student
     - Imperceptible delay
   - Optional video
     - needs better network connection
   - Class available in real time or afterward from
     recording
     - “Space-shift” or “time-shift” attendance
Goals of NEW

2. Minimize effort and cost to students, faculty and supporting institution
   - Runs on typical student PC or laptop
   - Inexpensive Linux or Windows server
   - No charge for software
   - Authoring in any graphic tool
     • Use existing slides
   - “Simulteaching” model lets network students attend an existing in-classroom course
     • No need to pay for another delivery
**NEW** Web Portal

- Simple interface to complex functions
  - Software load and test
  - Live access in multiple forms
  - Playback access in multiple forms
  - Chat rooms

- Focal point for course management
  - For instructors, database management and statistics
  - For administrators, server and webpage management

- Scalability
NEW Open Source Client Tools
Streaming Internet Course Delivery

- Audio
  - Speak Freely by John Walker (GUI by GMU)
- Whiteboard
  - WBD by Loughborough University UK (extended by GMU)
- Video
  - VIC by U of CA and University College London
- Floor control
  - NEWFC by GMU
- Record and Play controls
  - RC and PC by GMU
- Master Client (controls client configuration)
  - TLMC by GMU

© 2006 J. Mark Pullen & Priscilla McAndrews
NEW Client Configurations

- All use the same basic client
- Student
  - Basic client
  - Listen-only client
  - Video client
- Instructor
  - Teaching configuration
  - Recording configuration
  - Extra whiteboard for classroom
- Playback

NEW Usage Statistics

CS/IT Enrollment in Simulteaching Sections

© 2006 J. Mark Pullen & Priscilla McAndrews
NEW Usage Patterns Spring 2006

<table>
<thead>
<tr>
<th></th>
<th>Classroom</th>
<th>Online</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total enrolled</td>
<td>216</td>
<td>75</td>
<td>291</td>
</tr>
<tr>
<td>NEW users</td>
<td>92</td>
<td>75</td>
<td>167</td>
</tr>
<tr>
<td>Average live connections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>per active live user</td>
<td></td>
<td></td>
<td>14.0</td>
</tr>
<tr>
<td>Average playback connections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>per active playback user</td>
<td></td>
<td></td>
<td>6.6</td>
</tr>
</tbody>
</table>

Grade Outcomes: “No significant difference”

![Bar chart showing grade outcomes](chart.png)
Student Course-End Survey

*Typical online student comments:* The online mode allowed me to attend the lecture without commuting to school… I never had a problem connecting to NEW server and joining the class… one simply logs into the system and chooses a live connection from a web page menu … I find NEW to be a great tele-learning tool.

Ongoing *NEW* Development

- Present development of NEW is aimed at cross-platform capability
- Linux version is available for beta-testing
- MacOSX beta version planned for Fall 2006
- Functionality also continues to increase
  - OpenOffice spreadsheet integrated with whiteboard Spring 2006
  - Recording Editor planned for Fall 2006
NEW Publications
http://netlab.gmu.edu/NEW

Integrating Synchronous and Asynchronous Internet Distributed Education for Maximum Effectiveness, Proceedings of the IFIP World Computer Congress TC3 – Education, Santiago, Chile, August 2006 (Pullen)

Scaling Up a Distance Education Program in Computer Science, ACM Special Interest Group on Computer Science Education (SIGCSE) Bulletin, to appear (Pullen)

A Web Portal for Open-Source Synchronous Distance Education, Advanced Technology for Learning Vol 2 No 1, IASTED (Pullen & McAndrews)

An Open-Source Web-Based System for Synchronous Distance Education, to appear in IEEE Transactions on Education Vol.48 No. 4 (Snow, Pullen & McAndrews)

Low-Cost Internet Synchronous Distance Education Using Open-Source Software, ASEE Computers in Education Journal Vol 25 No 5 , to appear (Pullen & McAndrews)

NEW Software Components

Recorded Sessions
Record/Playback (REC/PLAY)

Audio Send/Receive (SF)

Floor Control/Chat Client (FC)

Record/Playback Control Client (RC/PC)

Whiteboard (WBD)

TLM Client (TLMC)

Video Send/Receive (VIC)

Prepared Slides PDF, PostScript, HTML or JPEG

User Workstation Software

Server Software

TCP or UDP tunnel

TCP connections

MySQL Database

NEW webpages

Apache Webserver

© 2006 J. Mark Pullen & Priscilla McAndrews