Promoting Student Engagement with Classroom Presenter

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What will the higher education classroom look like …

- If all students have computational devices
  - Laptops, Tablets, Ultra light tablets, PDAs, Cell Phones, Gameboys . . .
- If the devices are all connected
- If the devices are integrated into classroom instruction

Wide range of potential classroom applications

- Presentation
- Demonstration
- Simulation
- Accessing external resources
- Note taking
- Feedback
- Active learning
- Peer communication

Classroom Technology Vision

Classroom Pedagogy

Student Centric Applications

Sustainable Device Deployment

Study goals

- Are devices effective in achieving instructor specific classroom goals in the traditional lecture model
- What patterns of behavior arise when devices are deployed for classroom interaction
Classroom Presenter

• Distributed, Tablet PC Application
• Initial development, 2001-2002 at MSR
• Continuing development at UW
• Collaboration with Microsoft
• CP3 under development – Release Target, April 1, 2007

• Simple application
  – Ink Overlay on images
  – Export PPT to image
  – Real time ink broadcast
  – UI Designed for use during presentation on tablet
  – Presentation features
    – Instructor notes on slides
    – Slide minimization
    – White board

Deployment Studies
University of Washington

• Computer Science
  – Algorithms, Data Structures, Software Engineering, Digital Design
• College of Forestry
  – Environmental Science and Resource Management
• Classroom set of HP 1100 Tablet PCs
• Average of one activity based lecture per week
  – Remaining lectures standard slide based lectures
• One to three students per tablet

Key results

• Successful classroom deployments
  – Regular use throughout term
  – Generally positive evaluation by all participants
• Effective tool for achieving instructors’ pedagogical goals
• Lecture – Activity model
  – Alternating lecturing with activities
  – Avg. 4 activities per lecture (50 min. classes)
  – 4 min work time, 2 min discussion time per activity
  – 50% of class time associated with activities

Find a topological order for the following graph

Who was Dijkstra?

• List at least two of his contributions
Determine the LCS of the following strings

BARTHOLEMESIMPSION
KRUSTYTHECLOWN

Find a minimum value cut

Traveling Salesman Problem
• Given a complete graph with edge weights, determine the shortest tour that includes all of the vertices (visit each vertex exactly once, and get back to the starting point)

Special problem: Large Size
• List at least three problems trees must face (& solve) because of their large sizes.
1.
2.
3.
• Additional:

Computing Intersections
• What is the maximum number of self intersections of a stroke consisting of n points

Submission Examples
Classroom Usage

- Data from Undergraduate Algorithms course (Fall 2005)
- 7 lectures, 26 activities
- Logged data – timings of submissions

Time per activity

- Work time – students working independently on activities
- Discussion time – student work shown on public display
- Average work time: 4:29
- Average display time: 2:41
Time per activity

Participation rates
- Percentage of students present submitting work
  - Min 11%, Max 100%, Average 69%
- Some students would answer without submitting
- Resubmission common

Submission Rates

Display Behavior
- Average of 6.15 slides per activity displayed (minimum of 1, maximum of 18)
- Common pattern – show one or two for most of the time, and quickly show the others

Submitted and Displayed

Collaboration
- One to three students per tablet
- Interaction between students often encouraged
- Instructors would survey and occasionally comment on student work during activity phase
- Student work a key part of classroom discussion
Anonymity

• Work displayed on public display without any identification
• Limited information about submission displayed on the instructor machine
• Anonymous display valued by the students
• Students often believe the instructor can identify their work
• Tagging behavior observed

Results

• Comparison with classroom networks
  – Classroom response systems, “clickers”
  – Single display of rich responses versus aggregated, finite responses
  – Support different classroom goals
• Comparison with paper based activities
  – Most of the activities can be done with paper!
  – Improved logistics with digital system
  – Anonymity
  – Key is ability to incorporate into public display

Engagement and Participation

• Student participation rates very high
• Student submissions were optional
• No observed trends in submission rates

Positive survey results [1-5 scale]

• Digital Design Survey
  – Impact on learning 4.4
  – Value of seeing solutions displayed 4.3
  – Recommend to other instructors 4.1
• Algorithms Survey
  – Overall evaluation 4.6
  – Increased Engagement 3.5

Classroom Presenter 3

• Beta Release – April 1
• Current builds available from
• Most significant changes from CP2
  – Support for TCP/IP networking
  – Improved ink support
  – Direct import of PPT (no need for deckbuilder)
• For more information contact
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Any questions?

For more information, contact Richard Anderson
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http://www.cs.washington.edu/education/dl/presenter/
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