Promoting Student Engagement with Classroom Presenter

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Draw a picture of something from Corvallis

Student Attention vs. Time

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
    - CP3 Beta released, May 30, 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

Classroom Activities
- Pedagogical Goals
- Classroom Activities
**Discussion Artifact**
- Use student generated example to explore different aspects of a topic
- Assess overall understanding
- Diagnose misconceptions

**Western Washington Precipitation and Temperature**

**Discovery Activity**
- Have students derive a concept from an example

**Topological Sort**
- Given a set of tasks with precedence constraints, find a linear order of the tasks
- Label vertices with integers 1, 2, \ldots, n
- If v precedes w, then l(v) < l(w)

**Find a topological order for the following graph**

**Collective Brainstorm**
- Generate student ideas for discussion
- Build a list of ideas
- Analyze and evaluate responses
Special problem: Large Size

- List at least three problems trees must face (& solve) because of their large sizes.
  1.
  2.
  3.

Problem Introduction

- Have students explore an instance of a problem before topic is introduced.

Determine the LCS of the following strings

BARTHOLEMEWSIMPSON
KRUSTYTHECLOWN

Submissions

Challenge problems

- Competition in getting solutions
- Simultaneous work
- Submission and discussion

Handwriting Recognition: Identify the following words
Recognition results

All programmers are optimistic. Perhaps this is because they believe in happy endings and fun synergies.

Find a topological order for the following graph

Find a minimum value cut

Determine the LCS of the following strings

How good is this algorithm?
- Is it feasible to compute LCS of two strings of length 100,000 on a standard desktop PC? Why or why not?
- What is achieved on a microcomputer?

What type of tasks might have the following DFN?

What concerns would you have about using Tablet PCs in the classroom?
- Price?
- Battery life?
- Lack of familiarity?

Problems Reduction Examples
- Reduce the problem of finding the maximum of a set of integers to finding the minimum of a set of integers.
- Find the maximum of: 3, 7, 9, 2, 5

Submission examples

Testing
- Testing helps to establish if the algorithm works.
- Testing helps to identify bugs.
- Testing helps to improve performance.

Classroom Usage

- Data from Undergraduate Algorithms course
- Logged data – timings of submissions
- 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

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

Classroom Presenter 3

- Beta Release – May 30
- 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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