Guided Slides:
Flexible Lectures using a Tablet PC

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Frontiers in Education
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Outline

- Background and Motivation
- Creating Guided Slides
- Student Feedback
- Advice for Adopters
- Conclusion
Motivating Idea #1: *Weird Classrooms!*
Motivating Idea #2: Tablet PCs

- Because ... I had one!
Motivating Idea #2: *Tablet PCs*

- Because . . . I had one!
- Many suitable software applications available:
  - MS OneNote
  - DyKnow Vision
  - Classroom Presenter
  - Ubiquitous Presenter
  - . . .
First Try: Virtual Whiteboard

**Subsequences**

*Def.* A subsequence is a sequence formed from a proper subset of the elements of another sequence in which relative element order is retained.

*Ex.*: $g = 1, 2, 3, 2, 6, 8, 8, 9$

$h = 2, 3, 6, 8$

$i = 1, 2, 8, 6, 9$ **not a subsequence**

$A \cap B$

$(A-B) \cup (B-A)$

$C \quad D$
First Try: Feedback

- Many positive comments; e.g.:
  - “I really liked McCann taking notes on the tablet PC and posting them. It definitely isn’t a replacement for taking your own, but it is a good reference.”
  - “He writes the notes so we can write the notes before he starts speaking.”

- No negative feedback
Motivating Idea #3: Guided Notes

Guided Notes are:

- Instructor-prepared outlines of lecture topics
  - Distributed in advance to students
  - Include wide gaps for student note-taking
  - Helps students see what they should have learned and/or what they missed
Motivating Idea #3: *Guided Notes*

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- A successful technique that improves:
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  - Averages on exams, quizzes, etc.
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Why not ... Guided Slides?
Creating Guided Slides

1. Format slides in \texttt{LaTeX} with \texttt{Prosper}

2. Convert from \texttt{.dvi} to \texttt{.pdf}

3. Use \texttt{Imagemagick} to extract \texttt{.gif} slide images

4. Import the images into \texttt{Classroom Presenter}
   - Powerpoint (PPT) slides can be imported directly
A Word About Layout

How do you know that you have enough space?
A Word About Layout

How do you know that you have enough space?

Practice!

(Printed 4-up using Adobe Reader)
The Resulting Completed Slides

**Subsequences**

**Definition: Subsequence**

A subsequence is a sequence, formed from a subset of the elements of another sequence, in which the relative element order is retained.

**Example(s):**

→ $g$ is $1, 2, 3, 6, 7, 8, 9$, and $h$ is $2, 2, 6, 8$.

Is $h$ a subsequence of $g$? **Yes**.

→ $\{h_{n}^{3} \}_{n=1}^{7}$, where $h_{n} = \frac{1}{n}$. Is $\frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}$ a subsequence of this? **Yes**.

---

**Venn Diagrams**

- $A \cup B$
- $A \cap B$
- $A - B$
- $(A - B) \cup (B - A)$
Student Feedback

- Three consecutive offerings of sophomore discrete math
- End-of-semester anonymous surveys
- Return rates:

<table>
<thead>
<tr>
<th></th>
<th>Class #1</th>
<th>Class #2</th>
<th>Class #3</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Returned Survey</td>
<td>45</td>
<td>70</td>
<td>58</td>
<td>173</td>
</tr>
<tr>
<td>Took Final Exam %</td>
<td>56</td>
<td>80</td>
<td>72</td>
<td>208</td>
</tr>
<tr>
<td></td>
<td>80.4</td>
<td>87.5</td>
<td>80.6</td>
<td>83.2</td>
</tr>
</tbody>
</table>
Concern #1: Slide Availability

Question: Are students accessing the completed slides?
Concern #1: Slide Availability

Question: Are students accessing the completed slides?

Answer: Yes!

- Every one of the 173 students knew that the slides were available
- 95.6% accessed them at least once
- 53.2% accessed them 10 or more times
Concern #2: Impact on Attendance

Question: Does posting completed slides encourage absenteeism?
Concern #2: Impact on Attendance

Question: Does posting completed slides encourage absenteeism?

Answer: No!

‘Posted slides made me ? likely to go to class.’

<table>
<thead>
<tr>
<th></th>
<th>Class #1</th>
<th>Class #2</th>
<th>Class #3</th>
<th>Totals</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>More</td>
<td>6</td>
<td>10</td>
<td>7</td>
<td>23</td>
<td>13.5</td>
</tr>
<tr>
<td>No more / no less</td>
<td>38</td>
<td>50</td>
<td>45</td>
<td>133</td>
<td>78.2</td>
</tr>
<tr>
<td>Less</td>
<td>1</td>
<td>9</td>
<td>4</td>
<td>14</td>
<td>8.2</td>
</tr>
<tr>
<td>Overall</td>
<td>45</td>
<td>69</td>
<td>56</td>
<td>170</td>
<td>99.9</td>
</tr>
</tbody>
</table>

† Percentages do not total 100.0 due to rounding.
Concern #3: Note-taking Habits

Question: Will students still take their own notes?
Question: Will students still take their own notes?

Answer: Yes (mostly)

<table>
<thead>
<tr>
<th></th>
<th>Class #1</th>
<th></th>
<th>Class #2</th>
<th></th>
<th>Class #3</th>
<th></th>
<th>Totals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Σ</td>
<td>%</td>
<td>Σ</td>
<td>%</td>
<td>Σ</td>
<td>%</td>
<td>Σ</td>
<td>%</td>
</tr>
<tr>
<td>Detailed</td>
<td>26</td>
<td>57.8</td>
<td>32</td>
<td>45.7</td>
<td>25</td>
<td>43.9</td>
<td>83</td>
<td>48.3</td>
</tr>
<tr>
<td>Occasional</td>
<td>7</td>
<td>15.6</td>
<td>23</td>
<td>32.9</td>
<td>15</td>
<td>26.3</td>
<td>45</td>
<td>26.2</td>
</tr>
<tr>
<td>No Notes</td>
<td>12</td>
<td>26.7</td>
<td>15</td>
<td>21.4</td>
<td>17</td>
<td>29.8</td>
<td>44</td>
<td>25.6</td>
</tr>
<tr>
<td>Totals</td>
<td>45</td>
<td>100.1</td>
<td>70</td>
<td>100.0</td>
<td>57</td>
<td>100.0</td>
<td>172</td>
<td>100.1</td>
</tr>
</tbody>
</table>
Concern #3: Note-taking Habits (cont.)

Question: If boards / PPT were used?
Question: If boards / PPT were used?
Answer: Varies.

<table>
<thead>
<tr>
<th></th>
<th>(Whiteboards)</th>
<th>(.PPT/DocCam)</th>
<th>(.PPT)</th>
<th>(#2 &amp; #3 Only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class #1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\Sigma) %</td>
<td>17 37.8</td>
<td>8 11.4</td>
<td>5 8.6</td>
<td>13 10.2</td>
</tr>
<tr>
<td>Fewer Notes</td>
<td>3 6.7</td>
<td>19 27.1</td>
<td>18 31.0</td>
<td>37 28.9</td>
</tr>
<tr>
<td>Same Amount</td>
<td>25 55.6</td>
<td>43 61.4</td>
<td>35 60.3</td>
<td>78 60.9</td>
</tr>
<tr>
<td>Totals</td>
<td>45 100.1</td>
<td>70 99.9</td>
<td>58 99.9</td>
<td>128 100.0</td>
</tr>
</tbody>
</table>
Making Slides Available Early

‘If completed slides are available in advance, I would attend . . .’
Making Slides Available Early

‘If completed slides are available in advance, I would attend . . . ’

<table>
<thead>
<tr>
<th></th>
<th>Class #1</th>
<th></th>
<th>Class #2</th>
<th></th>
<th>Totals</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Σ</td>
<td>%</td>
<td>Σ</td>
<td>%</td>
<td>Σ</td>
<td>%</td>
</tr>
<tr>
<td>More Often</td>
<td>3</td>
<td>6.7</td>
<td>5</td>
<td>7.1</td>
<td>8</td>
<td>7.0</td>
</tr>
<tr>
<td>As Often</td>
<td>35</td>
<td>77.8</td>
<td>58</td>
<td>82.9</td>
<td>93</td>
<td>80.9</td>
</tr>
<tr>
<td>Less Often</td>
<td>7</td>
<td>15.6</td>
<td>7</td>
<td>10.0</td>
<td>14</td>
<td>12.2</td>
</tr>
<tr>
<td>Totals</td>
<td>45</td>
<td>100.1</td>
<td>70</td>
<td>100.0</td>
<td>115</td>
<td>100.1</td>
</tr>
</tbody>
</table>
Making Slides Available Early (cont.)

– Class #3 only –

‘Should completed slides be available in advance?’
Making Slides Available Early (cont.)

– Class #3 only –

‘Should completed slides be available in advance?’

Yes: 19  (32.8%)
No: 39  (67.2%)

Total: 58  (100.0%)
Question: Should I continue lecturing with a tablet?
And the Future?

Question: Should I continue lecturing with a tablet?

Answer: Yes!

<table>
<thead>
<tr>
<th></th>
<th>Class #1</th>
<th></th>
<th>Class #2</th>
<th></th>
<th>Class #3</th>
<th></th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Σ %</td>
<td>Σ %</td>
<td>Σ %</td>
<td>Σ %</td>
<td>Σ %</td>
<td>Σ %</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>45 100.0</td>
<td>69 98.6</td>
<td>55 96.5</td>
<td>169 98.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>0 0.0</td>
<td>1 1.4</td>
<td>2 3.5</td>
<td>3 1.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>45 100.0</td>
<td>70 100.0</td>
<td>57 100.0</td>
<td>172 100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Guided Slides in Other Courses?

- Surveyed 62 students in a subsequent data structures / algorithms course:

  ‘Should I use the tablet in this class, too?’

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>47</td>
<td>75.8%</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>8.1%</td>
</tr>
<tr>
<td>No Opinion</td>
<td>10</td>
<td>16.1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>62</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

FIE 2008 – p.19/23
• Over half (54.1%) have told us that they would use guided notes, at least occasionally, if they were available online.

• Putting it to the test this semester.
Advice for Potential Adopters

- Consider using a textbook as an arm rest
Advice for Potential Adopters

- Consider using a textbook as an arm rest
- Carry a video extension cable
Advice for Potential Adopters

- Consider using a textbook as an arm rest
- Carry a video extension cable
- Need to save time? Pre-write content
Advice for Potential Adopters

- Consider using a textbook as an arm rest
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- Need to save time? Pre-write content
- Choose color palette with projector in mind
Advice for Potential Adopters

• Consider using a textbook as an arm rest
• Carry a video extension cable
• Need to save time? Pre-write content
• Choose color palette with projector in mind
• Remove background color before posting slides
  ○ `imagemagick`’s `convert` utility works well
Conclusions

- Guided slides take roughly as much time to create as PPT slides
- Students have time to take notes
- Posting completed slides after lectures does not appear to adversely affect attendance
- Slides can be used as guided notes with little extra effort
- Students overwhelming support guided slides

“Every professor should do this!”
Any Questions?

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These full-screen PDF slides were created in LaTeX using the prosper class.