Interaction Patterns with a Classroom Feedback System: Making Time for Feedback

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The Classroom Feedback System (CFS)

Goal: Understand and expand the role of student interaction in large classes through technological interventions.

We believe student interaction and engagement are critical to learning. Therefore, we designed CFS to study and encourage one step of the interaction process: initiating feedback. By incorporating a radically different feedback mechanism from hand-raising, CFS creates the opportunity to understand patterns of interaction that are usually suppressed in large classes.

Method: Engineer a learning environment through iterative design, intervention, and study.

Using Ann Brown's 'Design experiment' methodology, we designed CFS for large, university classes. Our design process is detailed in the following table:

<table>
<thead>
<tr>
<th>Class Topic</th>
<th>Data System</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intro Comp Science</td>
<td>Observation</td>
<td>None</td>
</tr>
<tr>
<td>Theory in Info Tech</td>
<td>Observations, articles, instructor interview</td>
<td>Pre-and-post surveys</td>
</tr>
<tr>
<td>Theory in Info Tech</td>
<td>Observations, articles, instructor interview, logs of student survey, focus groups</td>
<td>Pre-and-post computer tests</td>
</tr>
<tr>
<td>Intro Comp Science</td>
<td>Observations, articles, instructor interview, logs of student survey, focus groups, class-wide survey</td>
<td>Full system</td>
</tr>
</tbody>
</table>

Prospective Feedback: Student-Guided Lecture Pattern

Scenario: The instructor, Jane, begins her discussion of program structure. As the slide comes up, a student notices the unfamiliar term “Linclud.” He annotates it, asking for more explanation. Jane sees the annotation but ignores it for now since she hasn’t reached that point on the slides. When she does, she circles “Linclud” and spends extra time explaining the concept.

Pattern: A student annotates early (ahead of lecture), and the instructor later adds the annotation into her discussion. Though a successful episode of feedback and response, the exchange is invisible to most of the class.

Retrospective Feedback: Feedback Lag Pattern

Scenario: During an example of an iterator, Bob, a student, is confused by a call to ‘next’. He doesn’t ask about it quite yet because the instructor, Jane, is still discussing the code. When she finishes and moves on to the next slide, Bob decides to annotate ‘next’, requesting more explanation. After a minute, Jane notices the feedback and responds to it, returning to the previous slide.

Feedback lag: A student delays her question until the instructor concludes his point (because he might be about to answer the question). But once he has clearly proceeded to the next point, the question seems out of place and is left unasked.

Pattern: A student whose question has been left behind simply annotates the previous slide. The instructor sees the annotation on his slide summary (left of the figure above) and decides when and whether to go back and address the question.

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Key enabling features of CFS:
- Context available to students early: The slide is revisited early enough to make this pattern possible.
- Context shared with instructor: The instructor can understand the context of annotations quickly. Furthermore, he can decide whether to postpone responding based solely on the geometry of the slide.
- Mechanism to close feedback loop: The instructor can see the student’s initial response, closing the loop of interaction with the student who gave the feedback and bringing the rest of the class into the discussion.

The computer-mediated feedback system enabled a novel pattern of interaction which would be impossible without the class.

Acknowledgments

Thanks to students and colleagues who contributed feedback and ideas, and to the sponsors of our research. Our work is supported by the National Science Foundation (CNS-0946167, CNS-1249861, 1344340, 1523014) and the National Institute of Health (1R01HL117831-01). The authors would also like to thank the CFS participants for the feedback they provided on initial versions of the system.

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