

# Experiences with Agile Teaching in Project-Based Courses

Valentin Razmov (valentin@cs.washington.edu)

Richard Anderson (anderson@cs.washington.edu)

University of Washington, Seattle

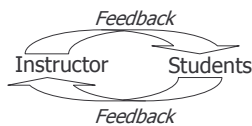
Learning = Practicing + Receiving Feedback + Reflecting on Results

## Our Pedagogical Goals

- Active student involvement
- Relevance of classroom discussions
- Opportunities for students to reflect

## Principles Defining Agile Teaching

- Adaptability to student needs and classroom context
  - By frequently seeking student feedback
  - Following the energy of the class
  - Makes classroom discussion and project experiences more relevant
- Short feedback cycles
  - For both giving and receiving feedback



- Helps everyone stay focused on what really matters
- Frequent project milestones (checkpoints)
  - To ensure that students are making progress and receiving timely guidance on what they're doing well and what could be improved
    - "noticing when a learner doesn't have a tool they need or isn't using a tool they already have" (Kent Beck)
  - Naturally provides opportunities for students to reflect on their experiences

## Structuring the Courses

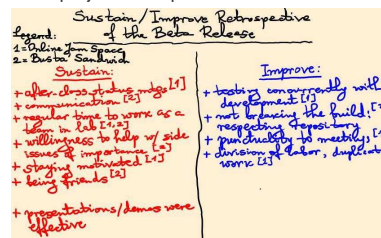
- Experiential learning on term-long projects where student teams are of size 5-8
- Intermediate project milestones set the stage for regularly giving and receiving feedback.

## Pedagogical Practices after Each Project Milestone

Not used for grading purposes!

Note: Instructors must switch roles to facilitators!

- Informal project feedback meeting with each student team
- In-class project retrospective



- Anonymous peer reviews

Legend: The highest rating is 5 (very positive evaluation), and the lowest is 1. Use the rating N/A when you have no relevant observations on that person. You may choose to rate yourself, or just leave the default N/A value.

Student Name	Team	Rating (1-5)	Strengths to Sustain (comments)	Areas to Improve In (comments)
John A.	A	5	team leadership and communication with the customer	being there on time at regular team meetings
Danny B.	A	3	constantly seeking new ways to improve the team's product	asking teammates if they agree with your innovations
Maria C.	B	4	willingness to help teammates in all aspects	not being afraid to speak up at meetings

## Strategies for Reacting to Student Feedback

- Choose appropriate class sessions for collecting and giving feedback
- React promptly and visibly
- Maintain a pool of topics and draw the ones with the highest contextual relevance and best fit to all constraints, including:
  - Project needs, Time available for content coverage, Student questions, Natural ordering of content, Overall importance to student learning, etc.
- Keep communication open by proactively approaching students who may disagree with the instructors' decisions

## Desirable Qualities of Feedback Mechanisms

- Accurate
- Representative
- Accessible
- Efficient
- Non-distracting

## Mechanisms for Just-in-Time Feedback

- Minute paper

### One-minute Feedback

- What one or two ideas discussed today captured your attention and thinking the most?
 

*"So simple there are no flaws"*
- List any ideas / concepts that you would like to hear more about in this class. Be specific.
 

*How far should you break down an entry for break*

- Mid-term / end-of-term questionnaire

M21.5	I could have extracted more value out of this course by ...	1. Doing more of the readings. 2. doing some of the suggested reading that I didn't have the time to read thoroughly. 3. Forcing myself to apply some of the practices despite the limited scope of the project. In the very least it would have exposed me directly to some of them. 4. Taking less classes... then I would have more time to spend on this class. 5. Doing more of the suggested readings. 6. I could have taken more initiative and contribute to and learn about other aspects of the project such as project management. 7. Being able to get up in the morning. 8. I think a larger team would have made for an even more interesting learning experience.
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- Reflective student writings
- Anonymous feedback forms
- via a Classroom Interaction System

Classroom Presenter is free for educational and non-commercial use. Available from [www.cs.washington.edu/education/dl/presenter/](http://www.cs.washington.edu/education/dl/presenter/)

### Chief Reasons for Software Project Failures: Question

- What might be the main reasons behind such a large percentage of software project failures?
 

State one reason that you and the person next to you think is prevalent.

*Shifting project requirements and goals.*

## Impact of Agile Teaching

- On instructors
  - Workload: time to understand student needs; refocuses instructor's time where it matters the most to students
  - Satisfaction: high; stimulating experience
  - Need for flexibility: may not fit everyone's teaching style and comfort level, but matches real-world aspects
  - Different mindset: goal-oriented, not content-oriented; may take time to get used to
- On students

Table 1. Class-averaged student perceptions of the value of different agile teaching practices and mechanisms. The scale was from -2 (strongly negative value) to +2 (strongly positive value). All numbers are taken from evaluations of the same course - software engineering - though the details of the individual course offerings differed between terms, including who taught the course, still, in all cases, at least one of the authors was involved.

	Winter 2005	Spring 2005	Summer 2005
Learning through experience	1.31	1.27	1.88
Incremental delivery approach	1.46	1.45	1.62
Post-milestone project discussion meetings	1.23	1.43	1.75
Post-milestone in-class retrospectives	n/a	n/a	1.00
Post-milestone anonymous peer reviews	1.15	1.31	1.38
Iterative format of reflective writing assignments	0.63	1.13	1.38

- Despite its novelty, the approach does not make students feel uncomfortable.

