Using the Agile Organizing Framework to Create Adaptive Learning Environments for Technology Development

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Motivation

"If you've lived in the software world for a few years you know the stuff they teach you in school is irrelevant, so who cares what degree you have?"

-- Jason Cohen, code review expert, at http://blog.asmartbear.com/not-competitive-advantage.html

Question: If much of the functional and skills-based knowledge that technology developers learn in school so quickly becomes obsolete, how can we best prepare students for jobs in the software world?

Answer: Model a mindful PROCESS in the classroom to *learn and do* technology development

What is the Agile Organizing Framework (AOF)?

- The AOF, developed using an interpretive case study approach, is "an empirically based framework grounded in Complex Adaptive Systems (CAS) theory that can be used to guide the organization of agile software development" (Vidgen & Wang, 2009)
- Effective mechanisms to guide agile software development should also be useful for guiding agile software development in the classroom where achieving learning objectives is critical
- **Our work mapped the AOF into a pedagogical approach modeled after agile software development**

Principle 1: Match Coevolutionary Change Rate

- *Coevolution of Team and Customer to Create Value*
- *Sustainable Working with Rhythm*

Principle 2: Optimize Self-Organizing

- *Collective Mindfulness*
- *Sharing and Team Learning*

Principle 3: Synchronize Exploitation and Exploration

- *Process Adaptation and Improvement*
- *Product Innovation*

Principle 1: Match Coevolutionary Change Rate

Agile Team Capabilities	Agile Learning Environment Enablers	Agile Learning Environment Inhibitors
Coevolution of Team and Customer to Create Business Value	Driven by evolving understanding and internalization of concepts: ● Continuous refinement of learning objectives ● Frequent iterative delivery of learning artifacts ● Close, effective interaction between instructor and students	● Instructor dictating syllabus, schedule, and assignment details, and signing off on assignments ● Syllabus set in stone at the beginning of the course ● Weak instructor/student relationship
Sustainable Working with Rhythm	Change is embedded in and is core to the learning process: ● Time-pacing through short, fixed-length iterations ● Regular and frequent breaks and closure ● Planning using small units of time ● Multilevel planning and replanning ● Small granularity of assignments and teaching problem decomposition	● Course pacing by planned events (e.g. tests) ● Unsustainable time-pacing ● Up-front planning for the whole course and following the plan rigidly ● Large granularity of assignments, deliverables, and plans (which impedes clarity and actionability) ● Overly restrictive or cumbersome course policies

Principle 2: Optimize Self-Organizing

Agile Team Capabilities	Agile Learning Environment Enablers	Agile Learning Environment Inhibitors
Collective Mindfulness	Self-management and team discipline: ● Shared responsibility for course management ● Team discipline through peer and self-observation	● Instructor-centered course management without feedback from students ● Instructor becomes bottleneck ● Instructor externalized from students
Sharing and Team Learning	Supportive structures for communication and collaboration visible to the team: ● Formed by interconnected practices ● Fostered by open working spaces ● Multiskilling	● Over-reliance on informal communication and collaboration ● Tasks allocated centrally by instructor with little consultation with students ● Isolated communication and collaboration depending on the willingness and attitudes of individual students

Principle 3: Synchronize Exploitation and Exploration

Agile Team Capabilities	Agile Learning Environment Enablers	Agile Learning Environment Inhibitors
Process Adaptation and Improvement	Reviewing and improving process regularly: ● Adapt learning process to learning context ● Remove redundant activities ● Actively involve students in identifying opportunities for improvements in the learning process even for already effective practices	● Learning process in the context of course management not internalized by students ● Learning process is imposed by the instructor and is seen as out of touch with students ● Over reliance on “common sense”
Product Innovation	Routinizing exploration: ● Formalizing extension of assignments to independently explore other aspects of the problem ● Allocate class time for independent investigation	● Course time not allocated to individual exploration ● Focus on attendance and mechanically achieving minimum expectations ● Lack of team-based exploration