Agile Research Studios: Orchestrating Communities of Practice to Advance Research Training

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Northwestern | Delta Lab | Design, Technology, and Research (DTR)
In two years...

- 36 students (32U, 4G)
- 18 student-led research projects
- 9 papers + extended abstracts
- 3 ACM SRC winners
RQ: How can a single faculty mentor train 20+ students to conduct independent research and produce research outcomes (and sleep at night)?
Faculty have limited time

- As a research group expands in size, faculty have less time to mentor each student.
- Faculty must tolerate slow research progress and not knowing the status of projects, or train only a few students.
- Or... overwork.
Students need regulation skills

- **Regulation skills**: cognitive, metacognitive, motivational, and emotional skills for reaching a goal. [Jarvela & Hadwin. 2013]

- Independent research requires regulation skills including **research planning** and **seeking help** to overcome challenges.

- Students lacking these skills are confined to rote tasks, or can struggle to make progress.
This talk: Agile Research Studio

- Model for research training in a learning community
- All students, regardless of seniority, conduct independent research and receive authentic research practice.
ARS scales faculty time

Apprenticeship
very small teacher to student ratio
[Collins, 2005]

Hierarchical, 1:1:1
grad students are novice mentors
[Shulman, 1986]

overcome 1:X
[Bain & Weston, 2012]

The ARS approach:
Dispersed Control
ARS develops regulation skills
ARS: Planning

Process: Sprint planning

Social structure: SIG meeting

Studio tool: Sprint log

2 weeks
ARS: Help & Collaboration

Process: Distributed help
Social structure: Studio meeting
Studio tool: Pair research [CSCW ’14]
Data Collection

- **Setting:** DTR, quarterly and repeated (for credit)
- **Participation:** enrollment data, student products
- **Regulation skills:** quarterly self-assessments
  - planning: sprint log revisions
  - helping: survey in the self-assessment
Outcomes

- 36 students designed, built, tested, and reported on 18 new systems.

- 96% of students stayed in DTR for 2+ quarters; most continue till they graduate.

Remote Paper Prototype Testing  
[Kevin, CHI 2015]

Habitsourcing  
[Katherine & Henry, UIST 2016]
Faculty Time: 10-12 hours/week

- SIG Meetings
- Studio Meeting
- In-person & Virtual Help
Planning

- Project teams revised their sprint logs each week
- **1.3 edits** during / after SIG
Planning Strategies

- building at the fidelity appropriate for the current stage of research
- prioritizing important features and research questions
- sequencing tasks
- defining concrete outcomes
- moving on despite uncertainty or imperfect knowledge.
Students helped 37% of their studio-mates each quarter

Of 372 help requests, 58% are fulfilled by a student in another SIG
Help-seeking

“I can ask for help and that everyone asks for help and it doesn’t make them stupid to need help."

“It is detrimental to try to work through blockers on your own. Asking for help should be the first step when you really get stuck on a blocker”
Productivity outcomes

- Students learn to prioritize research value
- Students catch problems and get help sooner
- Significantly expands number of student-led projects
Learning outcomes

- Students developing regulation skills
- Faculty can focus on training regulation skill
- Significantly expands authentic research experiences
Regulation skills beyond ARS?
How can I run an ARS Studio?
We will help you set up your studio.

Demo Tonight: 6–8pm, Multnomah/Holladay

ARS Starter Kit: agileresearch.io
ARS University

- Program for faculty and prospective faculty to come visit us and learn how to run an ARS studio
- Cost: **FREE**
- Sign up today at [agileresearch.io](http://agileresearch.io)
We can do better than this.
thank you

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