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

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Northwestern | Delta Lab | Design, Technology, and Research (DTR)

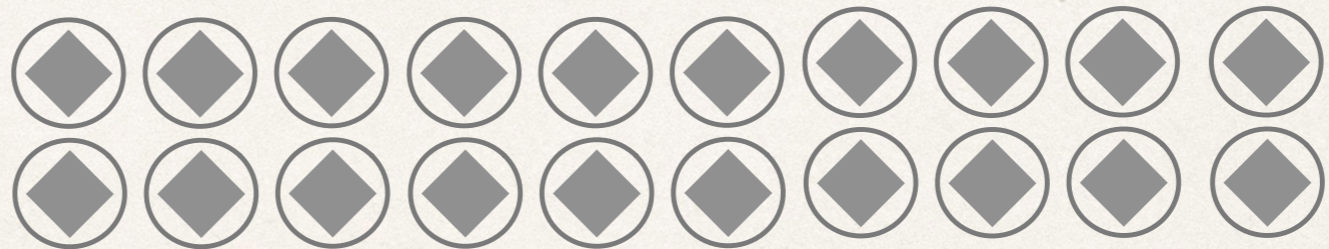# Design, Technology, and Research (DTR)
Winter 2016

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.
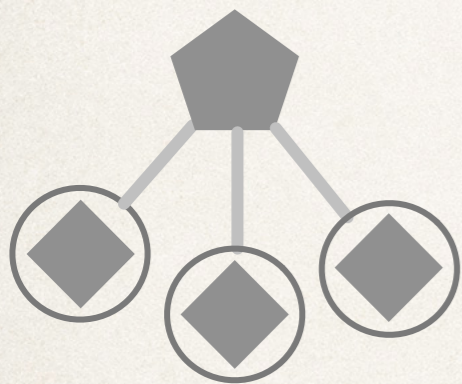
This talk: Agile Research Studio

✤ Model for research training in a learning community

✤ All students, regardless of seniority, conduct independent research and receive authentic research practice.

Set goal

Learn

Plan

Make progress

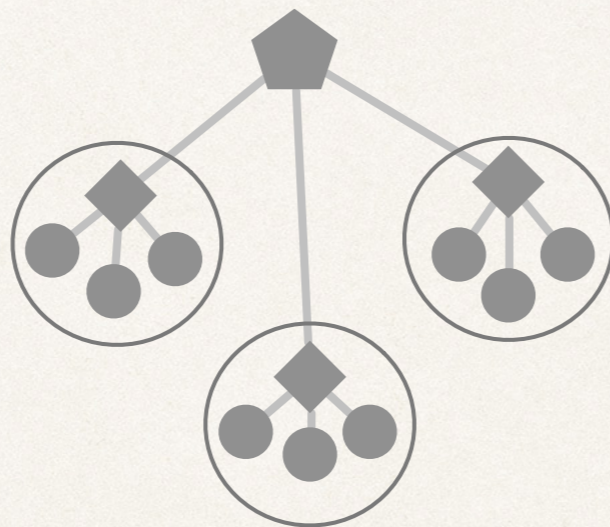Reflect

Project cycle
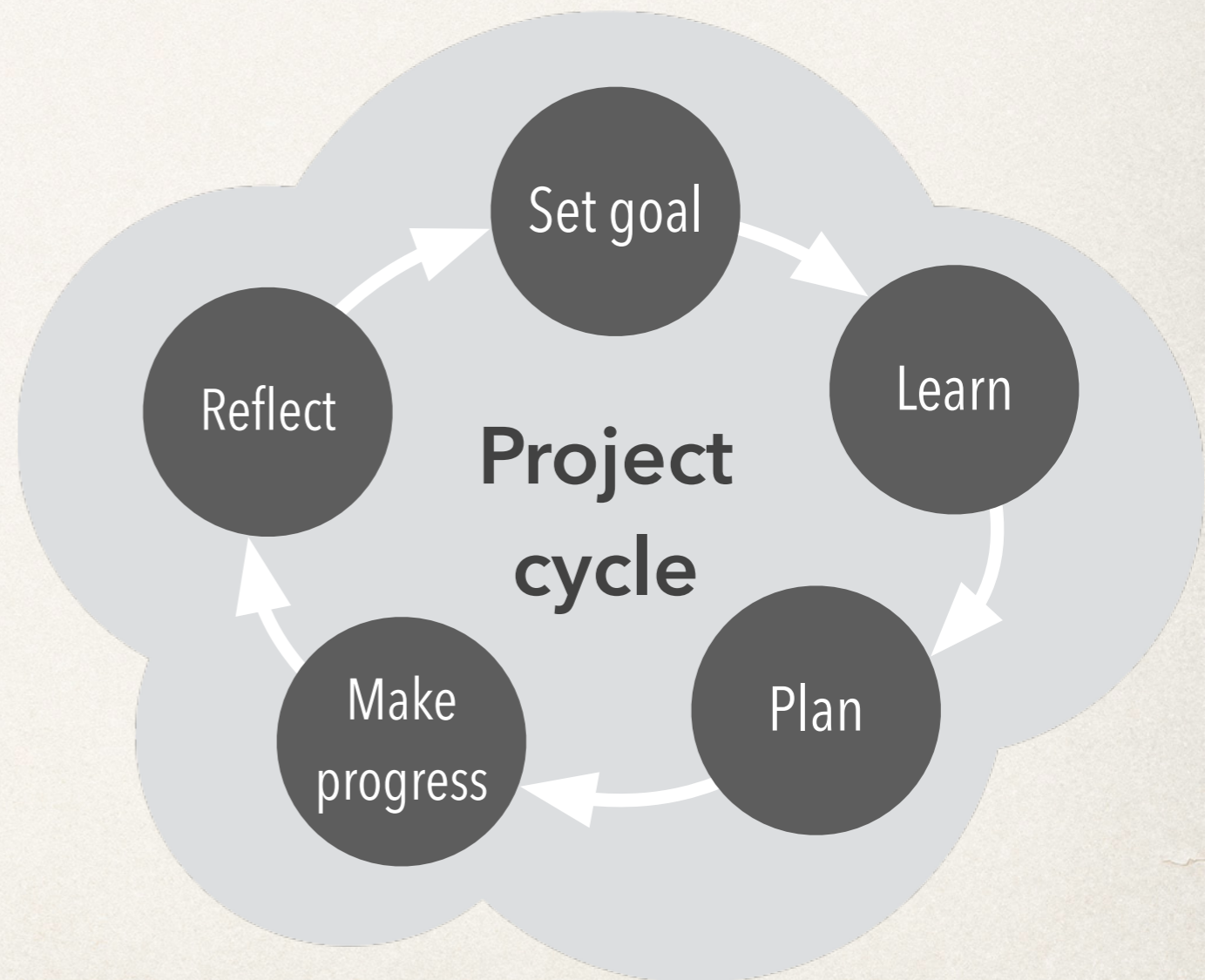
ARS scales faculty time
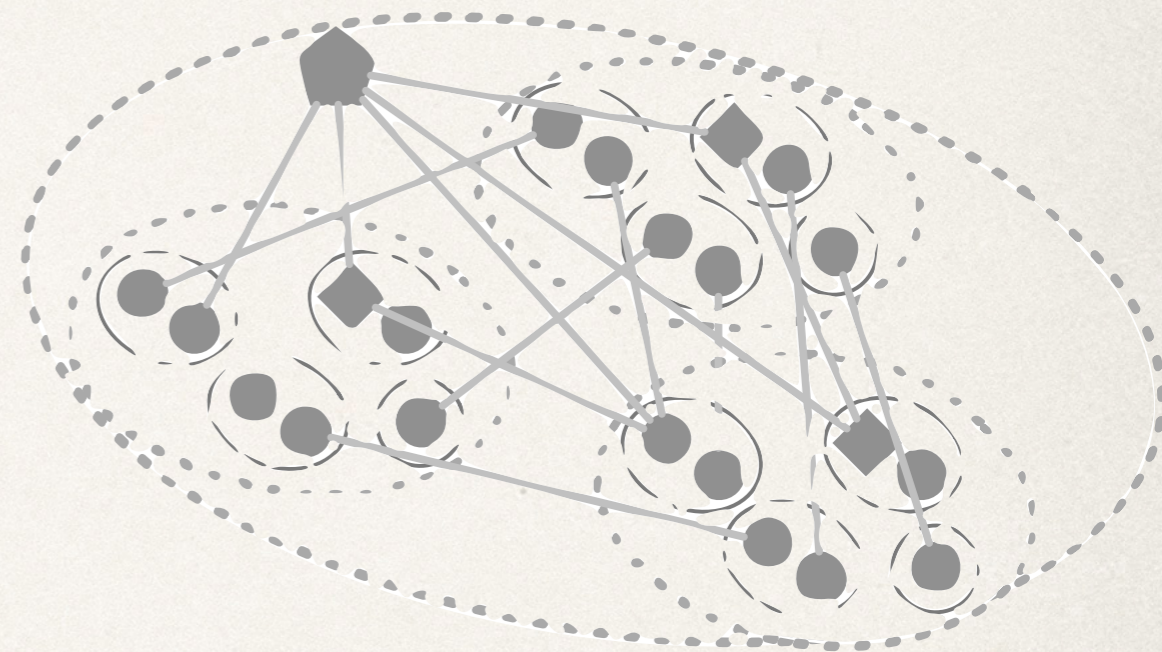
Apprenticeship

very small teacher
to student ratio
[Collins, 2005]

Hierarchical, 1:1:1
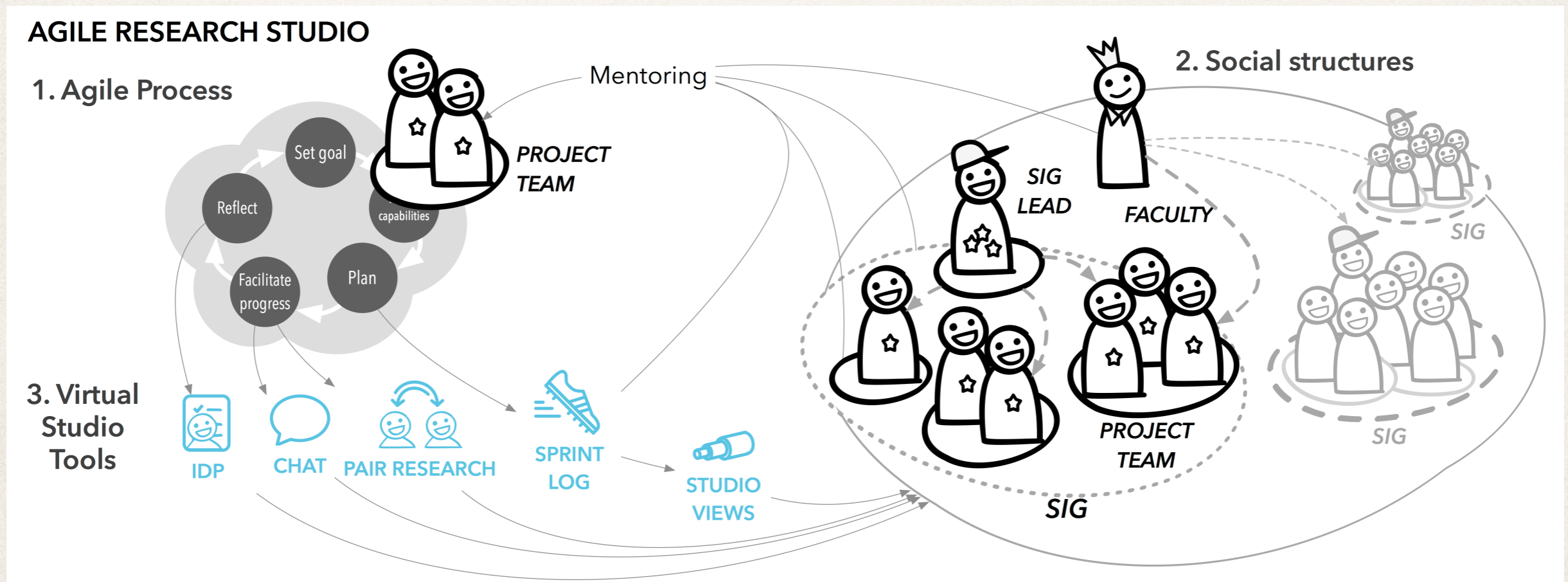

grad students are
novice mentors
[Shulman, 1986]

The ARS approach:
Dispersed Control

overcome 1:X
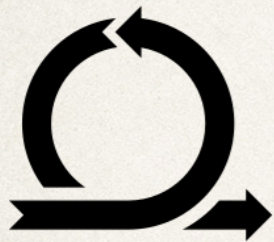*[Bain & Weston, 2012]*
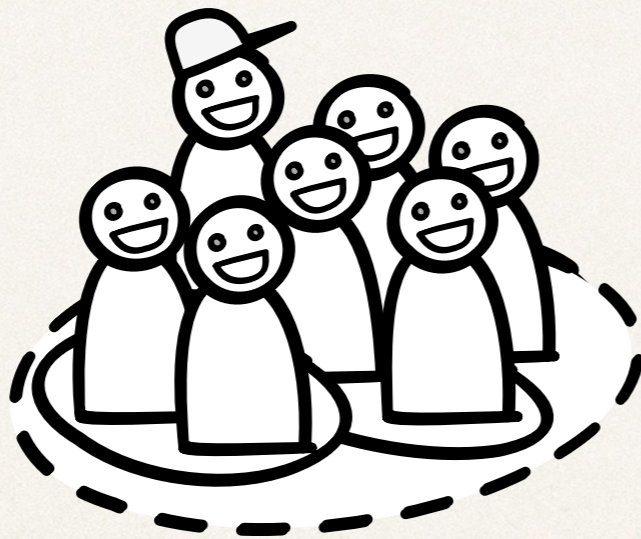
ARS develops regulation skills

ARS: Planning

Process:
Sprint planning

2 weeks

Social structure:
SIG meeting

Studio tool:
Sprint log

Team	Points Available	Points Committed	D	T	R	Hours Spent	D	T	R	Progress
Leesha	35	35	12	8	15	19.75	5	7	8	56%
Christina	16	19	1	17	2	6	1	6	0	32%
Total	51	54	13	25	17	25.75	5.75	13	8	48%

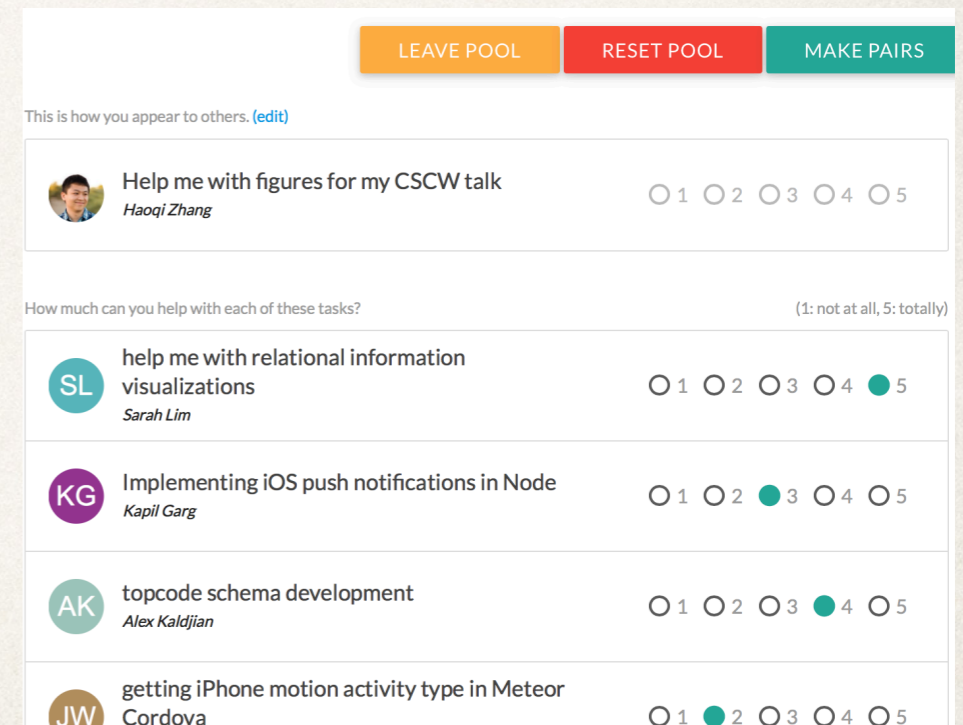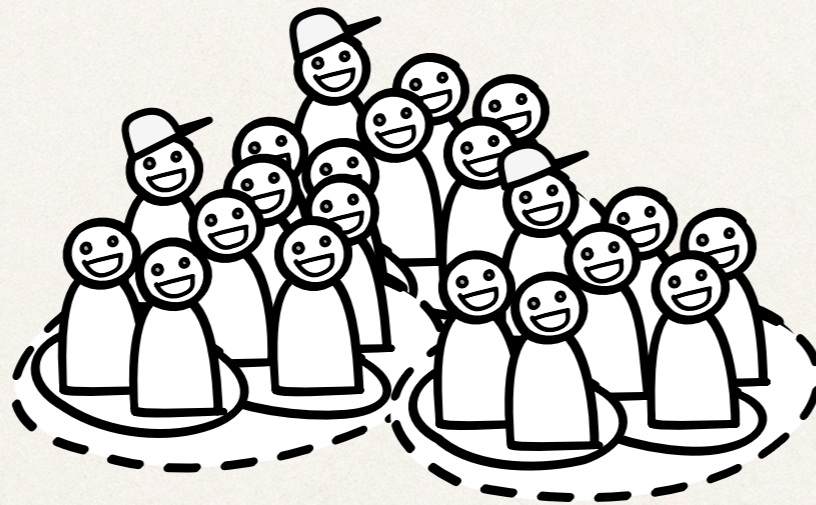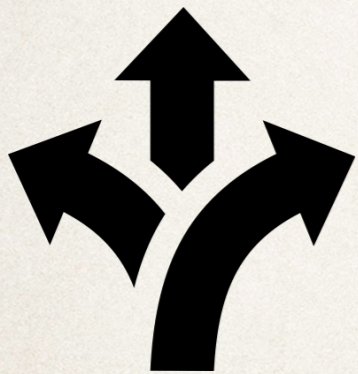| Stories	Tasks for Story	Points Required	D	T	R	Assigned To	Status	Hours Spent	Helpful Links
Have a functional tracking protoype that can track a runner's location and prepare data to be sent to a cheerer	*start entering tasks for this story on the next line ↓*	17	*mark*	*mark*	*mark*	*enter your name below to pick up tasks ↓*	*mark as: in progress, backlogged, or done*		
	pseudocode tracking protocol & structs	1		x		Leesha	done		pseudocode doc
	read Swift guide for protocols/syntax	2		x		Leesha	done	2	swift protocol docs
	go through Ray Wenderlich tutorial on POP	2		x		Leesha	backlogged		protocol oriented programming
	implement tracking protocol & structs	3		x		Leesha	in progress	5	
	implement tracking protocol & structs	5		x		Christina			
	Test tracking for cheerer	0.5		x		Christina			
	test tracking for runner	0.5		x		Christina			

ARS: Help & Collaboration

Process:
Distributed help

Social structure:
Studio meeting

Studio tool:
Pair research *[CSCW '14]*

Agile Process

PLAN — PROGRESS — REFLECT

Week 1 — *Week 2* — ...

Social Structures

Team meeting
- sprint plan

SIG meeting
- plan review

Studio Meeting
- peer help
- demo & critique
- learning modules

Team meetings
- work
- research log
- get help

SIG meeting
- progress & blockers

Studio Meeting
- peer help
- demo / critique
- learning modules

Team meetings
- work
- research log
- get help

Team meeting
- sprint reflect

Check-in
- learning reflect
- project reflect

Virtual Studio Tools

RESOURCES

Show plan

SPRINT LOG

STUDIO VIEW

Show problems

FACULTY & HELPERS

Mentoring

Seek help

CHAT

Match help seekers / givers

PAIR RESEARCH

Capture learning

RESEARCH LOG

Self-assess learning

IDP

Data Collection
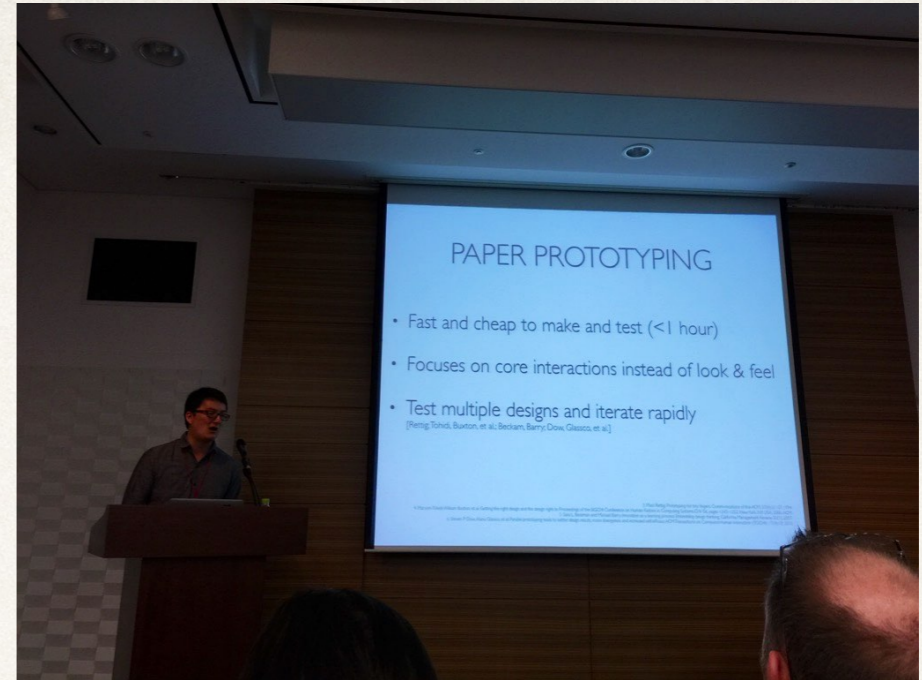
- **Setting:** DTR, quarterly and repeated (for credit)

- **Participation**: enrollment data, student products

- **Regulation skills**: quarterly self-assessments

  - planning: sprint log revisions

  - helping: survey in the self-assessment

Outcomes

Remote Paper Prototype Testing
[Kevin, CHI 2015]

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

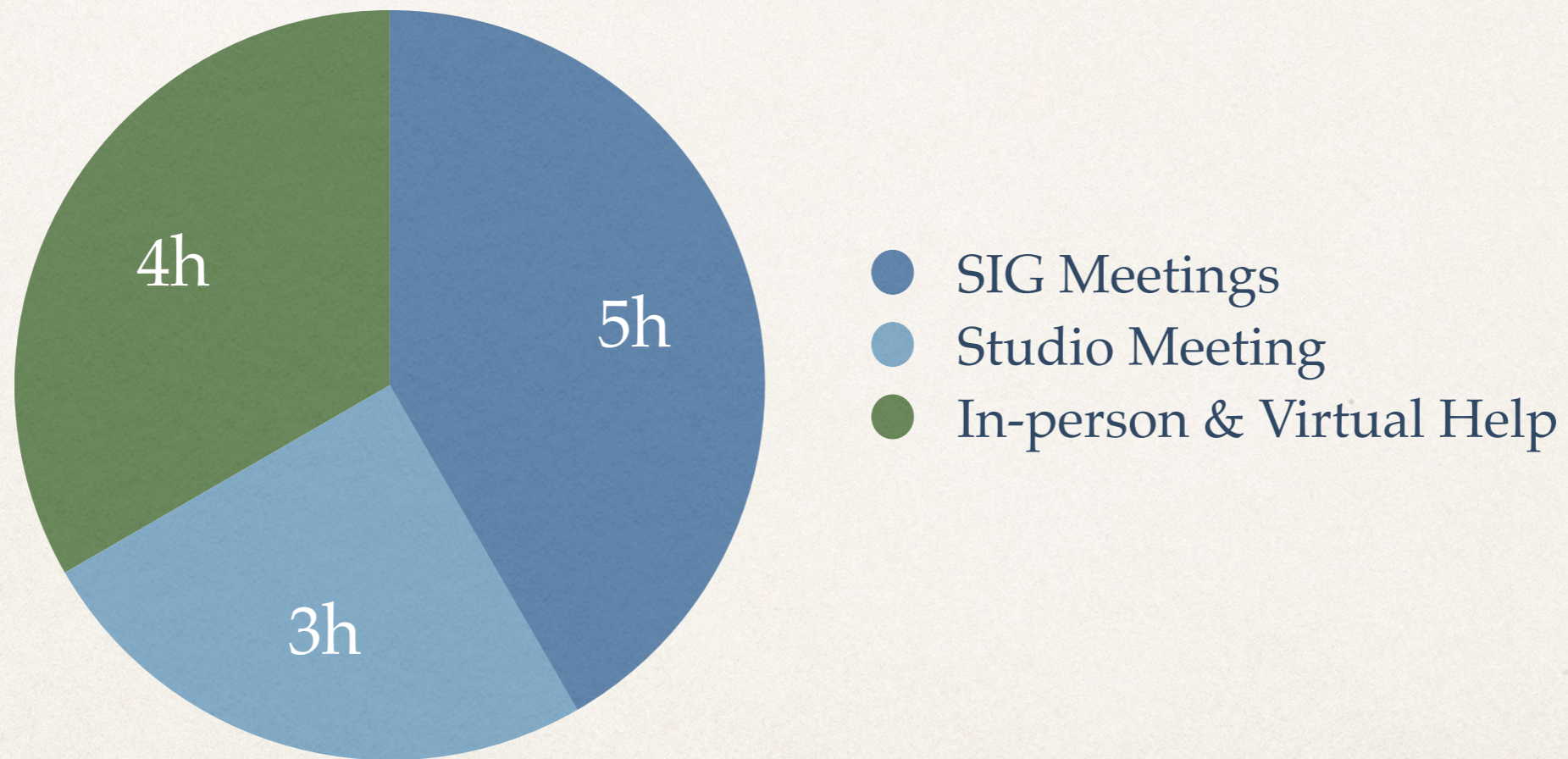✤ 96% of students stayed in DTR for 2+ quarters; most continue till they graduate.

Habitsourcing
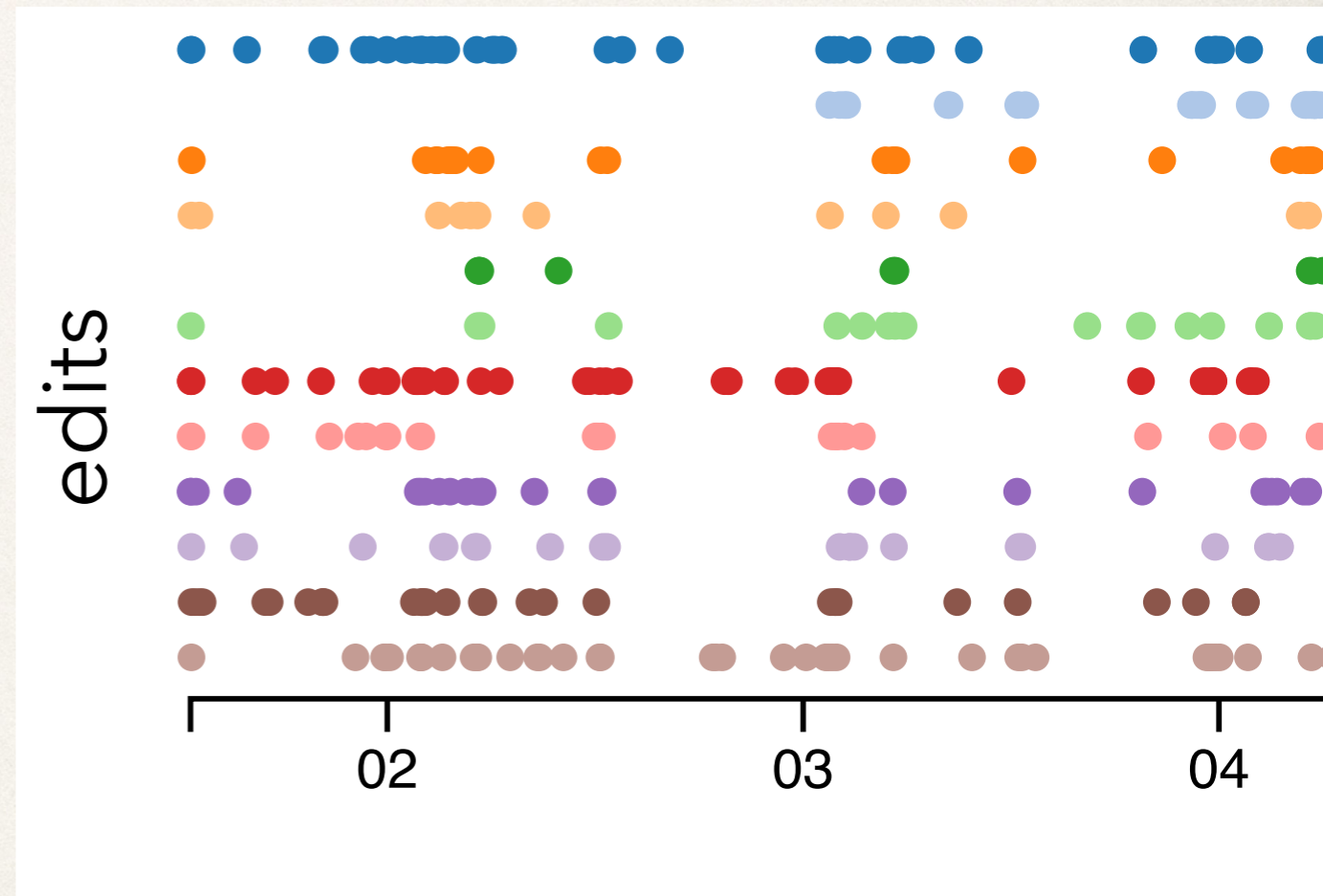*[Katherine & Henry, UIST 2016]*

Faculty Time: 10-12 hours/week

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.

Help

- Students helped 37% of their studio-mates each quarter

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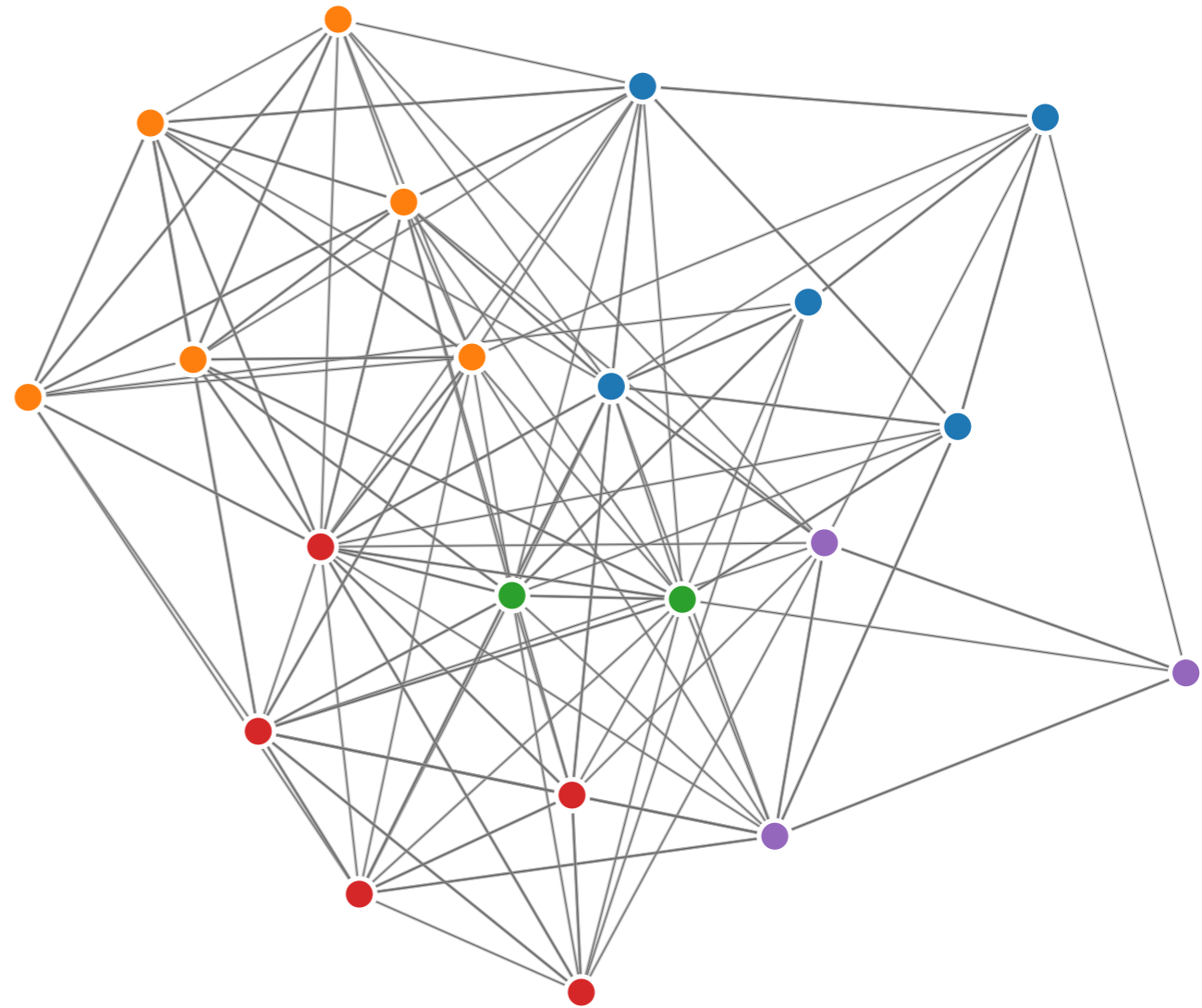
Help-seeking

"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

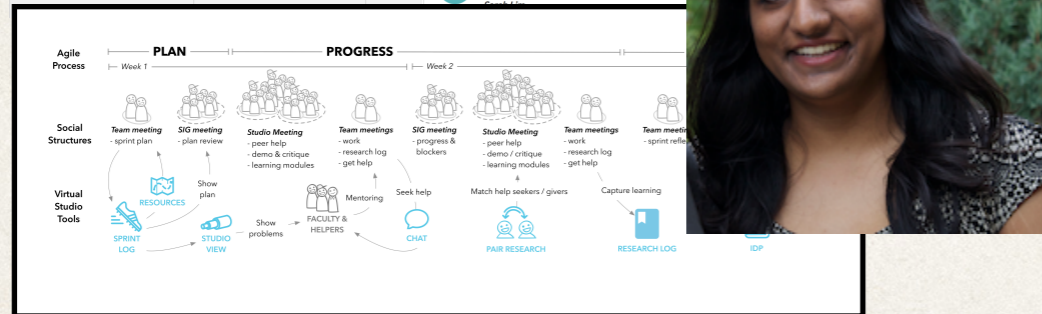# Regulation skills beyond ARS?

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**

We can do better than this.

thank you

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pairresearch.io
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DELTALAB