Main Idea

We are wrapping up a 5-year NSF IUSE project about POGIL in CS1. Our research questions were:

1. What factors influence faculty adoption of POGIL?
2. How does POGIL influence faculty perceptions and student perceptions of learning and engagement?
3. How does POGIL influence student learning?

About POGIL

Process Oriented:
- Students work in small, self-managed teams during class time
- With assigned roles: Manager, Presenter, Recorder, Reflector
- Dual focus on learning content and developing process skills

Guided Inquiry:
- Activities include models: figures, tables, code snippets
- Questions guide students through an EIA learning cycle
- Instructor facilitates learning; interactions among teams

Learning:
- Increased content mastery and knowledge retention
- Substantially higher pass rates and lower DFW rates

Five Stage Participant Timeline

<table>
<thead>
<tr>
<th>Participant timeline:</th>
<th>Year before</th>
<th>Summer</th>
<th>Before course</th>
<th>During course</th>
<th>After term</th>
<th>5. Posttest &amp; engagement</th>
</tr>
</thead>
<tbody>
<tr>
<td>project elements:</td>
<td>conference sessions</td>
<td>planning workshops</td>
<td>learning activities</td>
<td>mentor &amp; peer groups</td>
<td>reflection &amp; data</td>
<td>follow-up events</td>
</tr>
<tr>
<td>Lecture &amp; lab</td>
<td>2. Learn practices</td>
<td>3. Plan course &amp; learning activities</td>
<td>4. Apply practices &amp; assess progress</td>
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</table>

Faculty Perceptions

Interviewed instructors after teaching with POGIL for the first time:

- **Motivations** to adopt POGIL centered around improving student outcomes, including learning, engagement, and retention.
- **Challenges** ranged from how POGIL impacts their curriculum to logistical and institutional barriers, and of course time.

Student Perceptions

<table>
<thead>
<tr>
<th>Teamwork on learning and decision making (LDM)</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working in teams is a valuable experience</td>
<td>6%</td>
<td>22%</td>
<td>47%</td>
<td>24%</td>
<td></td>
</tr>
<tr>
<td>Teamwork is a productive use of time</td>
<td>2%</td>
<td>21%</td>
<td>42%</td>
<td>49%</td>
<td></td>
</tr>
<tr>
<td>Teams helped learn more than studying</td>
<td>10%</td>
<td>24%</td>
<td>35%</td>
<td>24%</td>
<td></td>
</tr>
<tr>
<td>Teams made good decisions</td>
<td>13%</td>
<td>21%</td>
<td>34%</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>Learned more on my own</td>
<td>13%</td>
<td>32%</td>
<td>32%</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>Team improved course grades</td>
<td>13%</td>
<td>31%</td>
<td>33%</td>
<td>19%</td>
<td></td>
</tr>
</tbody>
</table>

Broader Impacts

- Trained over 60 instructors at 45 institutions across the US
- Impacted over 5000 students – many participated in our study
- Disseminated 70 classroom activities for CS1 in Java/Python
- Facilitated over 10 POGIL workshops at national conferences

Evidence for Learning

Comparative study involving 282 students at the same institution:

- **Student Perceptions**
  - **Motivations** to adopt POGIL centered around improving student outcomes, including learning, engagement, and retention.
  - **Challenges** ranged from how POGIL impacts their curriculum to logistical and institutional barriers, and of course time.

Activity Writing Program

Currently supporting over 25 faculty to author and peer-review classroom activities for many CS courses.

- 2-day writing workshop (virtual)
- 3-day writer’s retreat (hybrid)
- Individual author coaching and mentoring

More Info

Visit introcspogil.org for classroom activities and links to publications.

References:
1. Yadav et al. POGIL in Computer Science: Faculty Motivation and Challenges. SIGCSE 2019.
6. Kusmaul et al. A Five Stage Faculty Development Program… Handbook of STEM Faculty Development.