In order for Research-Based Instructional Strategies (RBIS) to support widespread educational change, how curricula are implemented in specific, complex educational settings must be better understood [1].

We investigate:
1) What features of RBIS do faculty report using?
2) What modifications do faculty commonly make to RBIS?

Based on interviews with 15 self-reported users of Peer Instruction (PI) [2] across the country, we characterize:
- reported PI practices,
- prevalence of modifications to PI,
- challenges in implementing PI,
- strategies developed to address these.

### Discussion & Conclusions

#### Modifications to RBIS are common.

#### The effectiveness of common alterations should be investigated.

#### Curriculum developers could offer several examples of successful implementation rather just one.

Many PI users encountered difficulties in implementing PI, at times devising their own solutions. Student resistance, for example, was a common implementation barrier which faculty worked hard, and often creatively, to address. However, they did so with little guidance from the research community. We can learn from the solutions that PI users have designed. In future work we will investigate whether PI former users encountered similar difficulties and whether they were as successful at coming up with strategies to address them.

#### Struggles in using PI & Related Modifications

PI users expressed four common tensions or struggles in making PI work in their specific educational contexts:

1) Finding “good” PI Questions

“...it’s way easier to just put the quantitative problem out of the book than to come up with a conceptual question that’s really one that kind of digs down to the heart of what they don’t understand” (L247, T2).

2) Combining PI with other RBIS

“...as I talk to you I realize, I’m like, you know, I’m just pulling scattershot from this and that and this other thing. I know, and I’m kind of just making it up on my own” (L455, F2).

3) Student Resistance to PI

It is really interesting how sometimes getting them to talk to each other is like pulling teeth. Somehow they seem like they’re brought up in that they’re not allowed to talk in class” (L80, T3).

4) Concerns about Content Coverage

Most (11/15) professors had problems with student resistance towards or complaints about PI. Professors discussed the difficulty of changing students’ expectations. Ten professors had developed strategies for addressing these issues:
- Milling around the room (5)
- Telling students why they were doing PI (4)
- Joking with students (2)

“And you sometimes also have to gauge, after you do Peer Instruction, whether they really benefit from you cutting the material short, compared to you not having Peer Instruction” (L180, G4).

#### How do users implement PI?

**Characterization of Participants’ Self-Reported PI Implementation:** Columns show interviewees by institution type: Two-year colleges (T), four-yr. colleges offering BS/BA as highest phys. degree (F), & four-yr. colleges that a graduate degree in physics (G).

<table>
<thead>
<tr>
<th>PI Feature</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>F1</th>
<th>F2</th>
<th>F3</th>
<th>F4</th>
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<th>G2</th>
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</tr>
</thead>
<tbody>
<tr>
<td>PI tasks multiple choice</td>
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</tr>
<tr>
<td>Vote after discussion*</td>
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<tr>
<td>Out-of-class assignments</td>
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<td>✓</td>
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<tr>
<td>Commit to answer*</td>
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<tr>
<td>Conceptual questions</td>
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<tr>
<td>Tasks draw on student ideas*</td>
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<tr>
<td>Out-of-class assignments: Some student work is moved to out-of-class time which gives more flexibility during in-class time.</td>
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<tr>
<td>PI tasks multiple choice: In-class PI tasks have discrete answer options (multiple choice, Yes/No, or True/False).</td>
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<tr>
<td>Questions interspersed*: PI questions are interspersed in class.</td>
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<tr>
<td>Students discuss*: Students discuss their ideas with their peers.</td>
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<tr>
<td>Vote after discussion*: Students commit an answer after peer discussion.</td>
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<tr>
<td>Walks around the room: Instructor walks around the classroom during PI</td>
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</tbody>
</table>

**References & Acknowledgements**

This presentation is based upon work supported by the National Science Foundation under Grant No. 0715698. We thank all of the professors who dedicated their time and shared their experiences with us as part of this research study. We are grateful to our advisory board (Dr. Robert Beichner, Dr. Paula Heron, Dr. Priscilla Laws, and Dr. David Maloney) for their early feedback on the procedures for sampling interviewees and the interview protocol used. We also appreciate feedback from the PER group at University of Colorado at Boulder on this work.

5. A related list of essential features was vetted by Eric Mazur through personal communication 08/04/2009.