Increasing the Impact of PER: Recommendations from Typical Faculty

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RESEARCH QUESTION

What suggestions do non-PER faculty have about what PER could do to have a larger impact on college-level teaching practices?

Data Collection

Interviews: N=35

Participant Characteristics
(purposefully selected)
Level of Use of Peer Instruction[2]
- High User – uses with fidelity (N=7)
- Mixed – uses some features (N=18)
- Knowledgeable non-user (N=10)

Type of Institution
- Two-year college (N=11)
- Four-year college (B.A.) (N=12)
- Four –year college (Grad) (N=12)

One question in a larger interview:
"What would you recommend that the PER community do in order to have a larger impact on the teaching practices of typical physics faculty?"
Other parts of the interview also relevant.

3 faculty had no recommendations and are not included in this analysis

Analysis

- Emergent coding scheme

Identify statements from transcripts with recommendations for PER (N=125)

↓

Group statements that are similar

↓

Cluster groups into 4 main categories

References

[1] C. Henderson and M. Dancy, "The Impact of Physics Education Research on the Teaching of Introductory Quantitative Physics in the United States," *Physical Review Special Topics: Physics Education Research*, **5** (2), 020107 (2009).
[2] E. Mazur, *Peer instruction: A user's manual*, Upper Saddle River, New Jersey: Prentice Hall, 1997.

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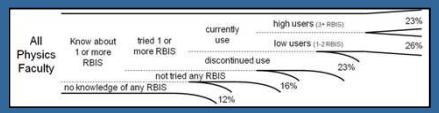
THE CURRENT SITUATION[1]

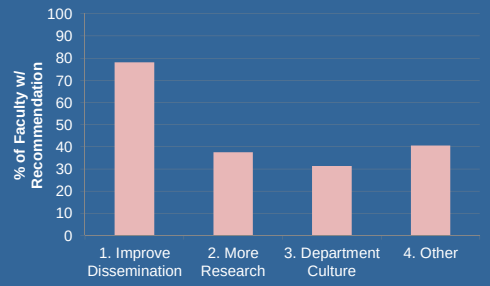
- There are many good PER-based instructional strategies available
- 50% of faculty say that they use at least one PER-based strategy
- Many report implementation difficulties
- Discontinuation is a problem
- Few adopters use strategies as recommended by developer



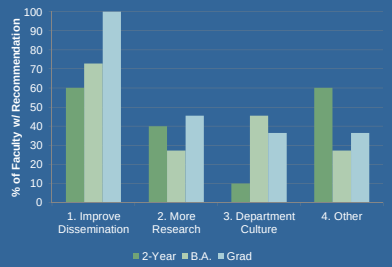
RESULTS

Four Categories of Recommendations

1. Improve Dissemination
   PER needs to improve dissemination efforts
2. More Research
   More research on PER methods is needed
3. Department Culture
   PER should focus on impacting department and institutional culture
4. Other

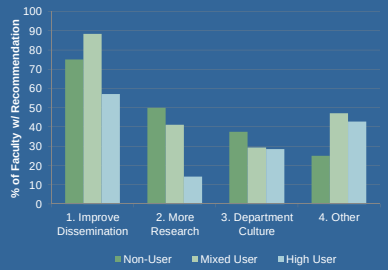


Type of Institution



- All participants from grad institutions feel that dissemination efforts should be improved. This is less of a concern for participants from two-year colleges (p=0.035, Fisher Exact Test).
- A significant fraction (>25%) of instructors from B.A. and Grad institutions report that PER needs to address problems with departmental culture.

Researcher-Defined User Status



- A significant fraction (>25%) of PI Non-Users and PI Mixed Users feel that more research is needed. This may be less of a concern for High Users (although there is no statistical difference between these groups).

Conclusions

Faculty have good ideas! We should listen to them.

Improving Dissemination
- Figure out how to provide user-friendly, convenient access to PER materials
- Customization happens – design to support it

More Research
- Study secondary implementations
- Develop assessments that measure things other than student conceptual understanding (e.g., problem solving ability)

Department Culture
- Utilize change models that focus on the department level - not individual faculty
- Help departments and institutions re-think how assessment of teaching effectiveness is done

Detailed Recommendations

Category 1: PER needs to improve dissemination efforts (78%*)
- There is so much PER stuff out there and it can be hard to find and sort through (34%)
  - Need easier access to PER materials.
  - Need ways to keep up with new ideas.
  - Need consultants to recommend solutions to departments.
- Disseminate to support customization (25%)
  - Need to do more to get faculty engaged in thinking about how well a PER product could work for them.
  - Teaching methods need to fit with personality (e.g., [PER person] is very gregarious and I am shy – how he manages class is not a good model for me).
- Higher profile dissemination efforts (22%)
  - for example, articles in *Physics Today*.
- It is important to start slowly when making instructional changes (9%)
  - PER should support this – or at least emphasize that it is OK.
  - There should be models or recommendations about how to make instructional changes slowly.
- It is important to have ways to learn about things in more detail (16%)
  - Not that it exists, like most talks, but how to really use it.
- Other (16%)
  - Dissemination needs to support successful use – often faculty try a technique and meet with failure.

Category 2: More research on PER methods is needed (38%)
- There is insufficient evidence-based support for PER pedagogies (16%)
  - PER research results are not believable -- Assessment methods in PER are biased towards the method being studied.
- Explicitly research how PER ideas work in different situations (16%)
  - How do PER ideas translate to types of institutions and students?
  - Much of PER is done at large R1 schools.
- PER should focus beyond conceptual understanding (13%)
  - Students need to learn how to solve problems in a physics class – many PER strategies focus on conceptual understanding.
- Other areas of research needed (6%)
  - Breadth vs. depth tradeoff.
  - Focus more on upper-level physics.
  - How to reduce student resistance.

Category 3: PER should focus on impacting department and institutional culture (31%)
- Instructional improvement is not valued by departments/institutions (19%)
  - More lobbying departments to support faculty (especially junior) who want to try PER strategies.
  - Get institutions to value SoTL.
- Assessment of faculty teaching not based on measures student learning (9%)
  - Faculty (especially untenured) see it as dangerous to experiment with PER and maybe get poor teaching evaluations.
  - Part of the problem is that research is easier to evaluate than teaching – better teaching evaluation tools needed.
- Other (13%)
  - Shouldn't spend too much departmental energy on intro courses – this saps energy (i.e., time and money) from physics majors.
  - There are a lot of good PER things, but to be most effective, the whole department should adopt a similar philosophy.
  - PER can help with assessment issues (i.e., growing emphasis on assessment).

Category 4: Other (41%)
- You can't change older faculty – you just have to wait.
- Astronomy does a better job at impacting faculty than physics does.
- TYC faculty can feel slighted when R1 schools get recognized for innovative teaching (something TYC faculty feel that they have been doing all along).
- Expose grad students to PER ideas.

* All percentages represent percentage of faculty expressing the recommendation.