

The Gap Between PER and Mainstream Faculty: The PER Perspective

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Abstract

During the summer of 2005 a web survey was distributed to the Physics Education Research (PER) community. The survey focused on two areas: (1) gaining respect for PER as a serious research area within Physics; and (2) getting results of PER known and used by physics faculty. Thirty-five PER practitioners and one research group responded. Respondents generally agreed that there were important problems in each area. This poster presents an overview of the survey results focusing on respondents' views of the underlying source of these problems and recommended actions for the PER community.



Two Issues

We are interested in identifying how those of us in PER may best cultivate productive relationships with faculty in physics departments. There are two objectives related to this topic:

Objective 1: Gaining respect for PER as a serious research area within Physics

Objective 2: Getting results of PER known and used by physics faculty

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Survey Goals

The goal of the survey was to gather data from the PER community about the two objectives:

- 1) **Gap**: How large is the gap between the current situation and the desired situation?
- 2) **Obstacles**: What are aspects of the current situation that make it difficult to reach these objectives?
- 3) **Opportunities**: What are aspects of the current situation that can help us reach these objectives?
- 4) **Actions**: What steps can the PER community (and individuals within the PER community) take to meet these objectives?

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Analysis Procedures

- Based on 35 respondents who completed the survey between July 13 and July 27, 2005.
- Likkert-Scale items → Summary Statistics
- Free response items → Categorization into three groups and clustering of similar items
 - Gap and Current Situation
 - Obstacles
 - Opportunities and Actions
- Joint response by 7 members of Sydney University PER Group (submitted Aug 3, 2005)

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The Gap Exists

| | 1 | 2 | 3 | 4 | 5 |
|---|----|----|-----|-----|-----|
| The lack of respect for PER as a serious research area in physics is an important problem for the PER community. | 3% | 6% | 11% | 31% | 50% |
| The lack of knowledge about and use of PER results by traditional faculty is an important problem for the PER community. | 6 | 0 | 9 | 34 | 51 |

(1 = Strongly Disagree, 3 = Neutral, 5 = Strongly Agree)

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The Current Situation

| | 1 | 2 | 3 | 4 | 5 |
|--|----|----|-----|-----|-----|
| a) Traditional physicists view PER research as not rigorous and/or unscientific. | 0% | 9% | 11% | 43% | 37% |
| b) PER is fundamentally different from traditional physics research. | 6 | 12 | 12 | 44 | 26 |
| c) There is insufficient funding for PER. | 3 | 6 | 26 | 31 | 34 |
| d) There are insufficient publishing opportunities for PER work. | 0 | 17 | 31 | 26 | 26 |
| e) Physics faculty view PER as not requiring any special skills or training. | 0 | 11 | 26 | 31 | 31 |
| f) Some self-described PER researchers do poor quality work. | 0 | 6 | 26 | 46 | 23 |
| g) Disseminating PER often requires telling faculty that they are not doing a good job. | 6 | 17 | 23 | 34 | 20 |
| h) Implementing PER typically requires faculty to change longstanding instructional practices. | 0 | 0 | 3 | 49 | 49 |
| i) Implementing PER is often difficult for faculty due to external factors beyond their control (e.g., student expectations, content coverage requirements, etc.). | 6 | 23 | 6 | 37 | 29 |
| j) Physics faculty have beliefs about teaching and learning that are inconsistent with the results of PER. | 0 | 0 | 11 | 37 | 51 |

(1 = Strongly Disagree, 3 = Neutral, 5 = Strongly Agree)

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The Current Situation – cont.

| | 1 | 2 | 3 | 4 | 5 |
|---|----|----|-----|-----|-----|
| k) Physics faculty teach very traditionally. | 0% | 3% | 17% | 49% | 31% |
| l) Physics faculty are not familiar with PER results. | 0 | 11 | 14 | 49 | 26 |
| m) Physics faculty believe that implementing PER requires too much time. | 0 | 0 | 29 | 46 | 26 |
| n) Physics faculty are happy with their current teaching and see no reason to change. | 0 | 14 | 14 | 46 | 26 |
| o) Physics faculty do not think PER should occur within the physics department. | 3 | 24 | 32 | 26 | 15 |
| p) Physics faculty believe that there is a need to better understand the teaching and learning of physics. | 6 | 27 | 24 | 36 | 6 |
| q) Physics faculty are capable of logical/rational debate on many issues - including issues of teaching and learning. | 0 | 20 | 6 | 60 | 14 |
| r) Physics faculty are capable of making significant productive adaptations to PER based curriculum. | 0 | 14 | 29 | 43 | 14 |
| s) Physics faculty believe that it is important to have a technically literate society. | 0 | 3 | 14 | 40 | 43 |
| t) Physics faculty want to do a good job in their teaching. | 0 | 6 | 21 | 41 | 32 |

(1 = Strongly Disagree, 3 = Neutral, 5 = Strongly Agree)

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Written Comments

| | N | % |
|---------------------------------|------------|------------|
| Total Number of Comments | 138 | 100 |
| The Gap | 15 | 11 |
| Obstacles | 35 | 25 |
| Opportunities/Actions | 81 | 59 |
| Other | 13 | 9 |

Notes:

- some comments were classified in more than one category
- classifications based on researcher judgment, not where the respondent placed them in the survey
- only subcategories with N>1 are reported

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The Gap

| The Gap | N = 13 |
|---|---------------|
| The gap is getting smaller | 4 |
| The gap depends on where you are | 4 |
| Physicists are interested in PER, but believe that it should be done in colleges of Education | 3 |
| Why is it important for us to be accepted by physicists in the physics department? | 2 |

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Obstacles

| Obstacles | N = 35 |
|---------------------------------|---------------|
| Problems with Faculty | 18 |
| Problems with PER | 12 |
| Structural/Institutional Issues | 7 |

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Obstacles – Problems With Faculty

| Problems with Faculty | N = 18 |
|---|---------------|
| PER research is qualitative and seen as 'nonreproducible' by physicists. Thus, they do not see that these results are valid or helpful. | 5 |
| Faculty (not just in physics) believe that it does not require special expertise to be a good teacher and, thus, do not use educational research. | 4 |
| PER provides little of value for traditional faculty who primarily care about physics majors. | 3 |
| Faculty are comfortable with their known instructional methods. Change is difficult. | 3 |

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Obstacles – Problems With PER

| Problems with PER | N = 12 |
|---|---------------|
| PER has generalized about what doesn't work in teaching, but has not presented a united view of what does work. | 3 |
| PER provides little of value for traditional faculty who primarily care about physics majors. | 3 |
| Textbooks form the curriculum for most physics courses. "PER" textbooks look just like traditional ones. | 2 |
| PER research is too qualitative and not rigorous enough. | 2 |

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Obstacles - Structural/Institutional

| Structural/Institutional Issues | N = 7 |
|--|--------------|
| There are no institutional incentives for faculty to improve their teaching. | 3 |

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Opportunities/Actions

| Opportunities/Actions | N = 81 |
|---|---------------|
| Improve Marketing of PER | 32 |
| Improve Rigor/Quality of PER | 23 |
| Develop Constructivist Professional Development | 11 |
| Learn from other related fields (and collaborate with experts) | 9 |
| Gain Administrative Buy-In | 6 |
| Improve communication with physicists | 6 |
| Collaborate with colleagues on teaching | 5 |
| Get young [traditional] faculty and grad students involved | 3 |
| Do not expect some faculty to change -- wait for retirement and death | 3 |
| Do more work on upper-level physics | 3 |

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Actions: Improve Marketing of PER

| | |
|--|-----------|
| Improve Marketing of PER | 32 |
| General | 5 |
| Get and publicize grants/ awards/recognition | 4 |
| Work within Physics (e.g., APS) community | 3 |
| Develop small products and sound bites to support them | 3 |
| Use high-profile "friends/consumers" | 2 |
| One-on-one interactions | 2 |
| Physics Today Articles | 2 |
| Work with K-12 | 2 |

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Actions: Improve Rigor/Quality of PER

| Improve Rigor/Quality of PER | N = 23 |
|--|--------|
| Need high-quality peer-reviewed publications | 4 |
| Focus on fixing common criticisms of PER (e.g., teaching to test, use of self-report data and student evaluations) | 4 |
| Focus on building and testing theories | 3 |

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Respondent Demographics

| Status | | Departmental Affiliation | |
|--|----|---|-----|
| Undergraduate Student | 3% | Physics Department (or similar) | 74% |
| Graduate Student | 9 | College of Education (or similar) | 9 |
| Post-Doc | 9 | Joint appointment between physics and education departments | 3 |
| Faculty - non-tenure track | 6 | Other | 15 |
| Faculty - tenure track (or equivalent) | 9 | | |
| Faculty - tenured (tenure based on PER work) | 14 | | |
| Faculty - tenured (tenure based on traditional physics work) | 29 | | |
| Faculty - tenured (tenure based on other work) (please describe) | 6 | | |
| Other (please describe) | 17 | | |

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Respondent Demographics – cont.

How long have you been involved with PER?

| | |
|--------------------|----|
| Less than 1 year | 6% |
| 1-3 years | 11 |
| 4-6 years | 29 |
| 7-10 years | 17 |
| More than 10 years | 37 |

How many PER faculty are at your institution?

| | |
|-----------|-----|
| 1 | 55% |
| 2 | 24 |
| 3 | 15 |
| 4 | 3 |
| 5 | 3 |
| 6 or more | 0 |

Type of Institution

| | |
|--|----|
| 2-year college | 6% |
| Private college | 11 |
| Teaching-oriented public college or university | 11 |
| Research-oriented university | 66 |
| Other | 6 |

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Obstacles (from Sydney University PER Group*)

- Obstacles
 - Strongly competing demands on time - our time and faculty's time
 - Heavy teaching loads
 - Lack of dissemination of PER results generated locally
 - Lack of dissemination of PER results generated in the whole PER community

*Joint Response from 7 members of Sydney University PER Group

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Opportunities/Actions (from Sydney University PER Group)

- Opportunities/Actions
 - Get more people involved in PER, even peripherally
 - Get National Bodies of Physicists interested in PER (The Australian Institute of Physics gets an A mark for this.)
 - Disseminate: publish papers, give colloquia
 - Do rigorous research (and more of it)
 - Separate teaching development and PER. In Australia there are too many conferences at which education practitioners "researchize" their practice. This is the sort of thing that does not impress our traditional physics colleagues who prefer to give credence to research-based work than to practice-based work.

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Summary

Survey Respondents from PER Community:

- Believe the lack of respect for PER and the lack of knowledge about and use of PER by traditional faculty are important problems.
- Think that both PER and faculty need to change in order to close this gap.
- In particular, PER should:
 - Improve marketing of PER.
 - Improve rigor and quality of PER.

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