# Table of Contents

**Implementation**
- Purpose of the SEP
- Course Level: What kinds of courses is it appropriate for?
- Content: What does it test?
- Timing: How long should I give students to take it?
- Example Questions
- Access: Where do I get the test?
- Versions and Variations: Which version of the test should I use?
- Administering: How do I give the test?
- Scoring: How do I calculate my students' scores?
- Clusters: Does this test include clusters of questions by topic?
- Typical Results: What scores are usually achieved?
- Interpretation: How do I interpret my students' score in light of typical results?

**Resources**
- Where can I learn more about this test?
- Translations: Where can I find translations of this test in other languages?

**Background**
- Similar Tests
- Research: What research has been done to create and validate the test?
  - Research Validation
  - Research Overview
- Developer: Who developed this test?

**References**
Implementation

Purpose of the SEP
To examine the relationship between physics self-efficacy and student performance in introductory physics classrooms.

Course Level: What kinds of courses is it appropriate for?
Intro college

Content: What does it test?
Beliefs / Attitudes (self-efficacy)

Timing: How long should I give students to take it?
5 minutes

Example Questions
I can solve for the variable $r$ in the expression $F = \frac{Gm_1m_2}{r^2}$

Strongly Disagree  Disagree   Neutral   Agree   Strongly Agree

Access: Where do I get the test?
Download the test from physport at www.physport.org/assessments/SEP.

Versions and Variations: Which version of the test should I use?
The latest version of the SEP, released in 2004, is the pilot version (version P).

Administering: How do I give the test?

- Give it as both a pre- and post-test. This measures student learning.
  - Give the pre-test before you cover relevant course material.
  - Give the post-test at the end of the term.
- Use the whole test, with the original wording and question order. This makes comparisons with other classes meaningful.
- Make the test required, and give credit for completing the test. This ensures maximum participation from your students.
- Tell your students that the test is designed to evaluate the course (not them), and that knowing how they think will help you teach better. Tell them that correctness will not affect their grades (only participation). This helps alleviate student anxiety.
- Refer to the test by a generic title like "Physics attitudes test" to prevent students from looking up the answers.
- For more details, read the PhysPort Guides on implementation:
  - PhysPort Expert Recommendation on Best Practices for Administering Concept Inventories
    (www.physport.org/expert/AdministeringConceptInventories/)

Scoring: How do I calculate my students’ scores?

- Each student's score is sum of their points for each question, where strongly disagree is 1 point, strongly agree is 5 points, and disagree, neutral and agree are 2-4 points respectively. Possible range of scores is 8 to 40.
- Use the PhysPort Assessment Data Explorer for analysis and visualization of your students’ responses
  (www.physport.org/explore/SEP)

Clusters: Does this test include clusters of questions by topic?
There are no clusters of questions on the SEP.

Typical Results: What scores are usually achieved?

Typical scores on the SEP from Shaw 2004 for males and females in a conceptual physics course (Table 2), two terms of college physics courses (Table 3) and a calculus-based second semester physics course (Table 4). In conceptual physics, male students
had a higher mean score than female students. In college physics and calculus-based physics, there is no significant difference in responses between male and female students.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>(\bar{x})</th>
<th>s</th>
<th>R</th>
<th>p</th>
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<td>28.64</td>
<td>4.97</td>
<td>0.297</td>
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<tr>
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<td>&lt;0.0001</td>
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**Table 2**: SE for conceptual physics course

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<th>s</th>
<th>(\sigma_E)</th>
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<tr>
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<tr>
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<td>5.12</td>
<td>0.99</td>
<td>0.350</td>
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**Table 3**: SE scores for male and female students in College physics course.

<table>
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<tr>
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<th>N</th>
<th>(\bar{x})</th>
<th>s</th>
<th>(\sigma_E)</th>
<th>p</th>
</tr>
</thead>
<tbody>
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<td>30.78</td>
<td>4.45</td>
<td>1.05</td>
<td></td>
</tr>
<tr>
<td>M</td>
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<td>29.15</td>
<td>6.37</td>
<td>0.83</td>
<td>0.317</td>
</tr>
</tbody>
</table>

**Table 4**: SE scores for male and female students in 2nd semester calculus-based physics course.

**Interpretation**: How do I interpret my students' score in light of typical results?

It is hoped that students’ SEP scores improve as a result of your course or at least do not decrease from pre- to post-test. Aim for positive shifts in scores from pre- to post-test. You can also compare your SEP scores to those listed in Typical Results.

**Resources**

**Where can I learn more about this test?**


**Translations: Where can I find translations of this test in other languages?**

You can download translations of this test in the following languages from PhysPort:

- Chinese: translated by Junpeng Zhang
- English

If you know of a translation that we don't have yet, or if you would like to translate this assessment, please contact us!

**Background**
Similar Tests

The SOSESC-P has 33 questions, whereas the PSEQ and SEP have 5 and 8 questions, respectively, so the SOSESC-P probes more dimensions of self-efficacy in more depth than the other surveys. There is a lot more variety in the questions on the SEP than the questions on the PSEQ. The SEP asks students about their belief that they can solve very specific physics problems, their comfort using a computer, and if they consider themselves good at mathematics, whereas the PSEQ questions are about physics in general. All have the same level of research validation.

Research: What research has been done to create and validate the test?

Research Validation: Bronze

This is the third highest level of research validation, corresponding to at least 3 of the validation categories below.

- [x] Based on research into student thinking
- - [ ] Studied using student interviews
- [x] Studied using expert review
- - [ ] Studied using appropriate statistical analysis
- - [ ] Research conducted at multiple institutions
- - [ ] Research conducted by multiple research groups
- [x] Peer-reviewed publication

Research Overview

Based on a literature review, the developers created an 8 question pilot version of the SEP where the questions were modeled after self-efficacy questions from surveys in other disciplines. The questions underwent expert review and were revised. The SEP was tested with over 500 students, and the results are published in one peer-reviewed paper.

Developer: Who developed this test?

Kimberly A. Shaw

References