

Research-based resources on PhysPort

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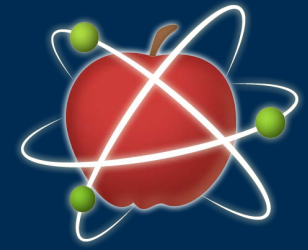
PEER-Monterrey
May 2017
Day 2

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QUE-1847887
QUE-1322728
PHYSP-161261





PhysPort

Supporting physics teaching with research-based resources

What is PhysPort?

A web resource to support physics professors in using research-based teaching and assessment in their classes

www.physport.org



PhysPort.org

Eleanor Sayre, esayre@ksu.edu

PhysPort Team



American Association of Physics Teachers



Sam McKagan (*Director*)
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Lyle Barbato (*development lead*)
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Bill Hsu (*development lead*)
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Cognition Technology



Sandy Martinuk
Alex Bell
(*User Experience*)

Periscope Specialists



Rachel Scherr
Stephanie Chasteen

How do you know if students are learning?

Assessment is a gateway drug

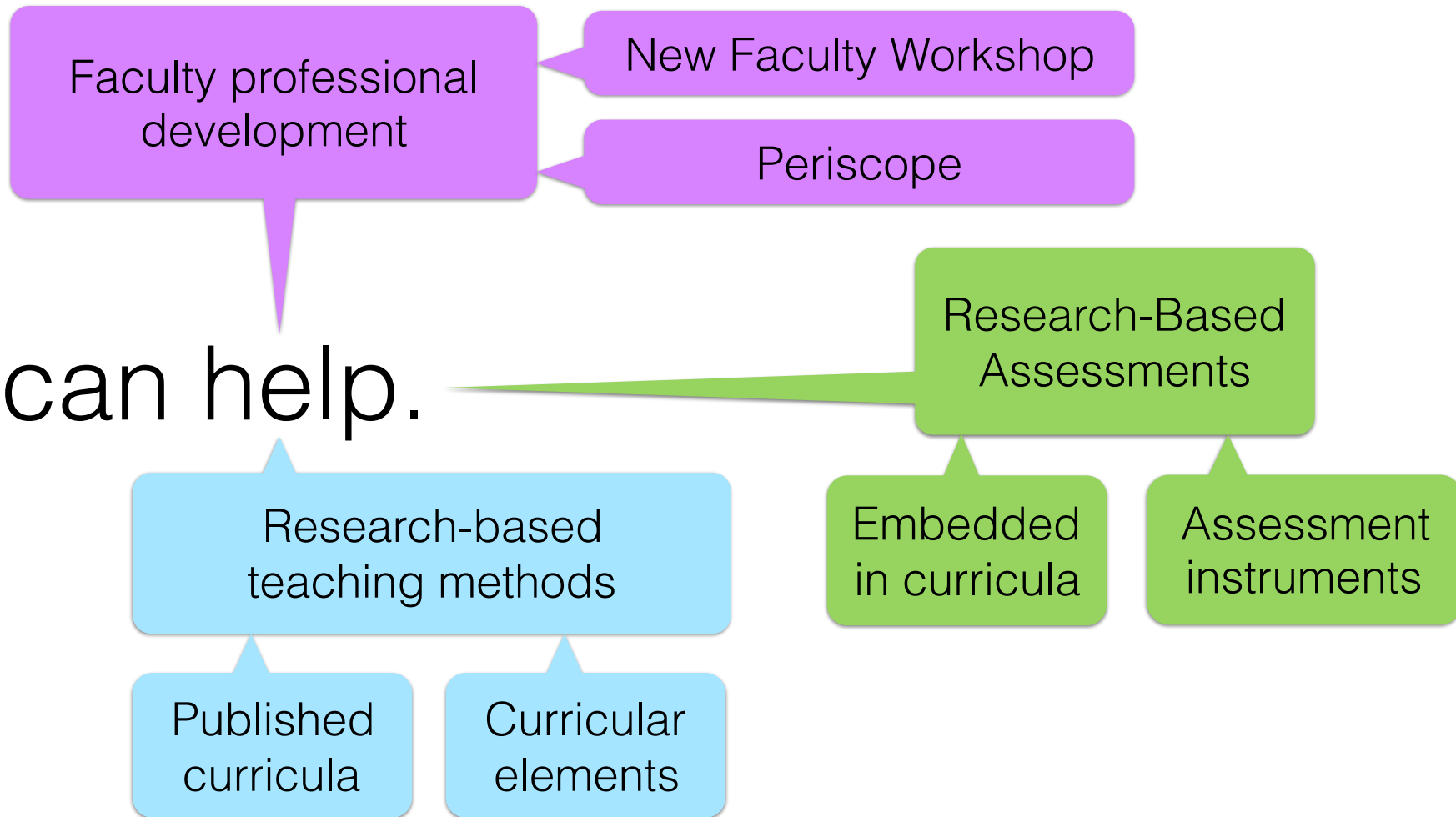
Good teaching and assessment are important.

How to teach better?

How to help students learn more?



PER can help.



Developer websites

Ask a colleague

Attend a workshop

PER resources are scattered.

How to compare teaching methods?

Which assessment should I use?

What works best for my context?

How do I support diverse learners?

course

program



PhysPort can help.



Finding information and advice

Changing teaching practices

Supporting physics teaching with research-based resources

Faculty-centered online resources

Synthesis research

Synthesis research

Interpret the results of diverse PER studies

Weighted combination of data from published studies

More robust than single study

Vulnerable to publishing bias

100,000 students

Madsen, McKagan, & Sayre (2013). Gender gap on concept inventories in physics: What is consistent, what is inconsistent, and what factors influence the gap? *PhysRevST-PER*

Madsen, McKagan, & Sayre (2015). How Physics Instruction impacts students' beliefs about learning physics. *PhysRevST-PER*

Von Korff, *et al* (in press). Secondary Analysis of Teaching Methods in Introductory Physics : a 50k - Student Study. *AmJPhys*



What are Research-based Assessments?

Force Concept Inventory (FCI)

Force & Motion Conceptual Evaluation (FMCE)

and 80+ more

These are:

- Generally multiple-choice surveys
- Carefully crafted questions
- Conceptual topics across the physics curriculum
- Additionally: beliefs, problem-solving skills, affect

Force Concept Inventory

30 Questions

A stone dropped from the roof of a single story building to the surface of the earth:

- (A) reaches a maximum speed quite soon after release and then falls at a constant speed thereafter.
- (B) speeds up as it falls because the gravitational attraction gets considerably stronger as the stone gets closer to the earth.
- (C) speeds up because of an almost constant force of gravity acting upon it.
- (D) falls because of the natural tendency of all objects to rest on the surface of the earth.
- (E) falls because of the combined effects of the force of gravity pushing it downward and the force of the air pushing it downward.



Force Concept Inventory

RESEARCH VALIDATION SUMMARY

Based on Research Into:

- ✓ Student thinking

Studied Using:

- ✓ Student interviews
- ✓ Expert review
- ✓ Appropriate statistical analysis

Research Conducted:

- ✓ At multiple institutions
- ✓ By multiple research groups
- ✓ Peer-reviewed publication

About half of the questions on the FCI come from an earlier test called the Mechanics Diagnostic Test (MDT). Questions on the MDT were developed using students ideas from open-ended responses. These questions were then reviewed by experts, refined through student interviews and given to over 1000 students. Statistical analysis of the reliability of the MDT was conducted and the pre- and post-test were found to be highly reliable. For those FCI questions not taken directly from the MDT, open-ended responses and responses given by students in interviews were compared to ensure the questions were being interpreted correctly. Since its release, over 50 studies have been published using the FCI at both the high school and college level at over 70 institutions and including data on over 35,000 students. Most notable is the study by Hake (1998) comparing FCI scores based on instructional method for over 6500 students.

Available on
PhysPort!

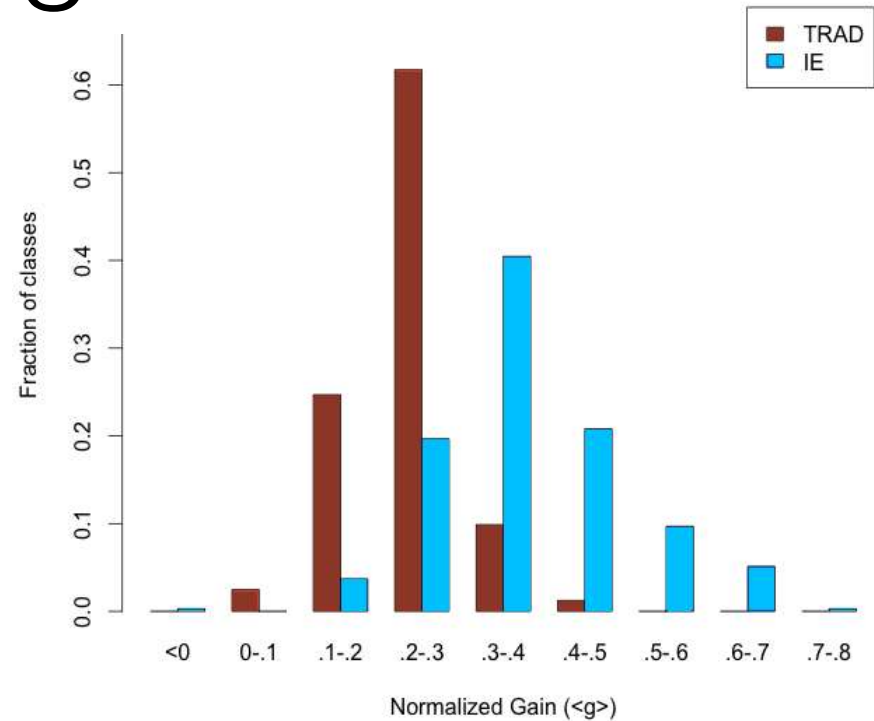


Mechanics teaching

active learning
students do stuff
many different ways

Interactive engagement
is better than
traditional lecture

chalk-and-talk
sage on the stage
cookbook labs



50,000 Students

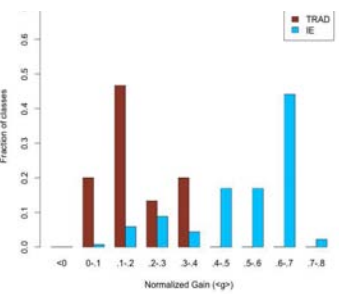
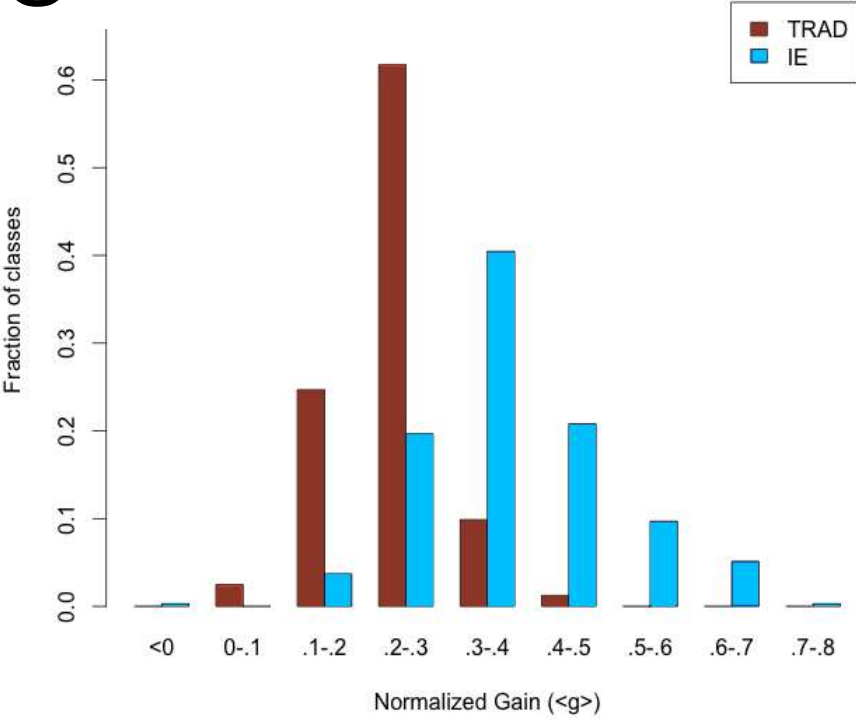


Mechanics teaching

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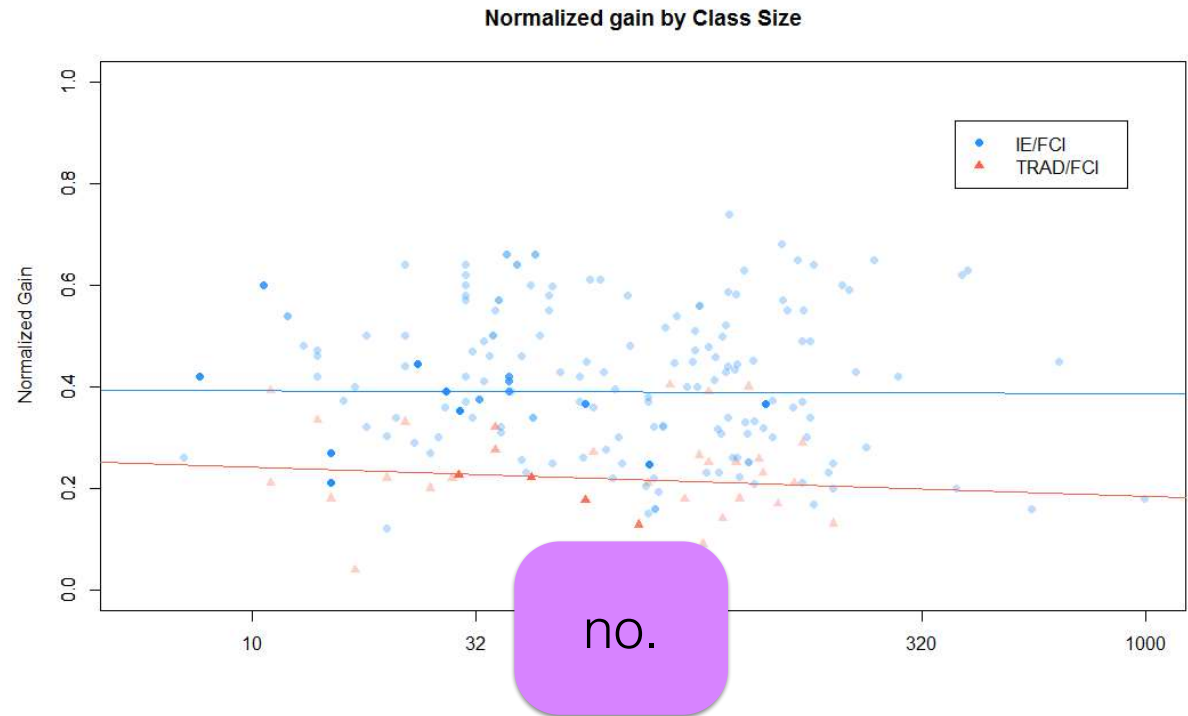
chalk-and-talk
sage on the stage
cookbook labs



Von Korff, J., et al (2016). Secondary Analysis of 1 Introductory Physics : a 50k - Student Study. Ame

Does class size matter?

- Different sizes use different IE methods.
- Same trend for lecture and lab

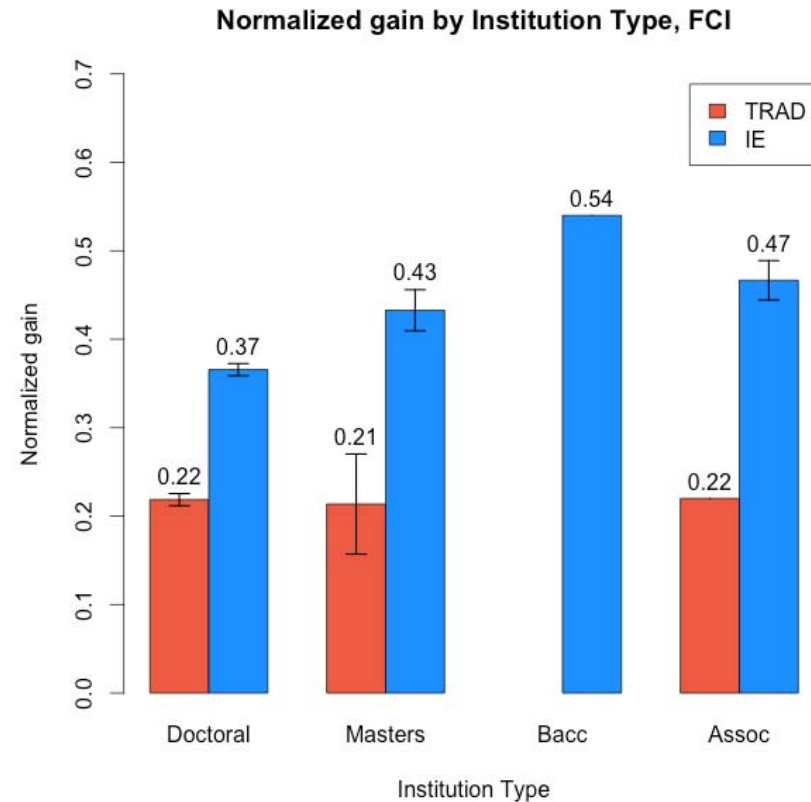


Does institution type matter?

- Reduced Carnegie classification
- Only US schools

no.

- Highly dependent on publishing effect
- Data are mostly Doc institutions.



Student beliefs about physics

- How much do students' beliefs align with physicists?
- Measure **shifts** in physicist-like belief
- CLASS, MPEX

12 beliefs and attitudes surveys available on PhysPort!

Survey

1. A significant problem in learning physics is being able to memorize all the information I need to know.

Strongly Disagree | 1 2 3 4 5 | Strongly Agree

2. When I am solving a physics problem, I try to decide what would be a reasonable value for the answer.

Strongly Disagree | 1 2 3 4 5 | Strongly Agree

3. I think about the physics I experience in everyday life.

Strongly Disagree | 1 2 3 4 5 | Strongly Agree

4. It is useful for me to do lots and lots of problems when learning physics.

Strongly Disagree | 1 2 3 4 5 | Strongly Agree

5. After I study a topic in physics and feel that I understand it, I have difficulty solving problems on the same topic.

Strongly Disagree | 1 2 3 4 5 | Strongly Agree

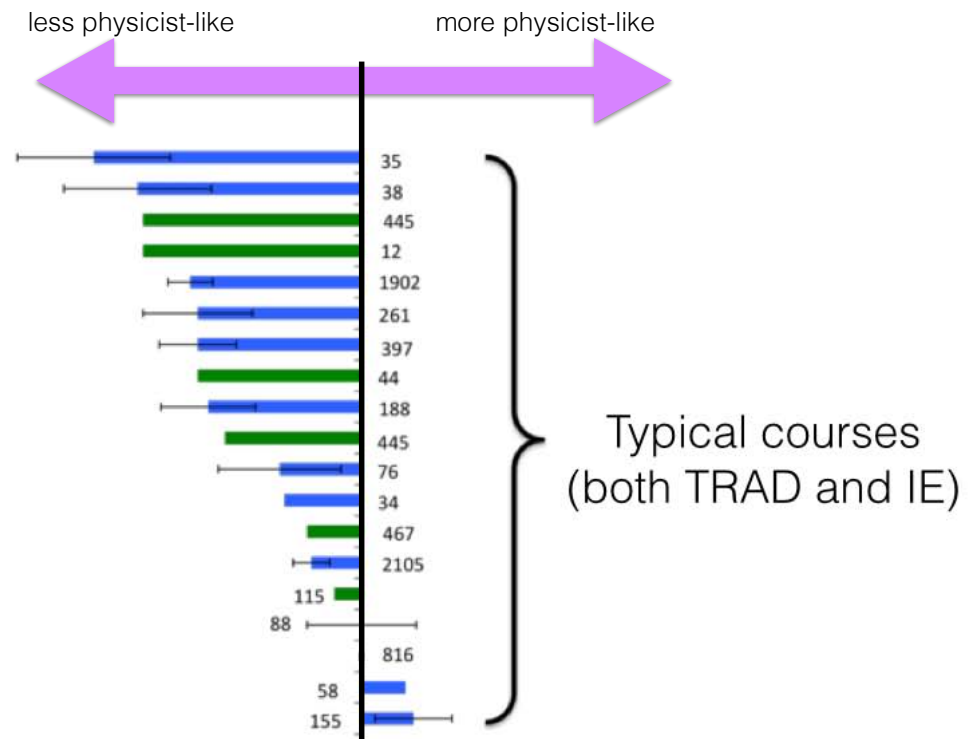
Adams, W. K., et al (2006). New instrument for measuring student beliefs about physics and learning physics: The Colorado Learning Attitudes about Science Survey. *Physical Review Special Topics - Physics Education Research*, 2(1), 010101.



Student Beliefs

- 24 studies
- Teaching method, class size, student population

"Ordinary" IE is not enough.



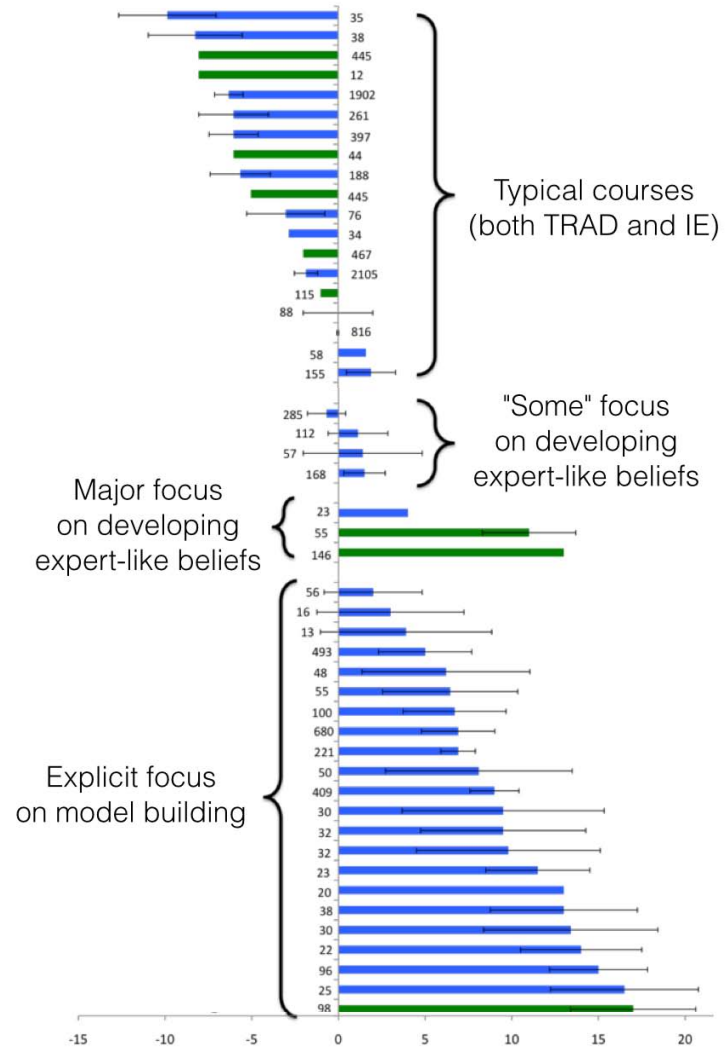
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Student Beliefs

- 24 studies
- Teaching method, class size, student population

"Ordinary" IE is not enough.

Focus on connecting ideas and observations. ("model building")



Madsen, A. M., McKagan, S. B., & Sayre, E. C. (2015). How Physics Instruction impacts students' beliefs about learning physics. *Physical Review Special Topics — Physics Education Research*.

Gender gaps in learning physics

Men outperform women on RBAs

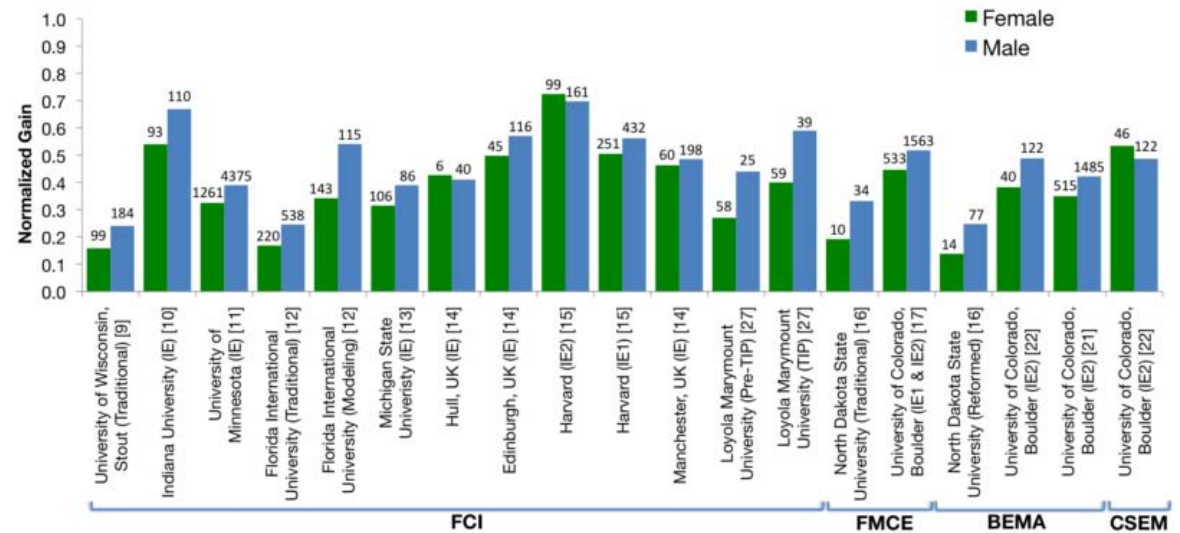
Mechanics: Men = .43; Women = .37

E&M: Men = .42; Women = .36

This is smaller than the Trad / IE gap.

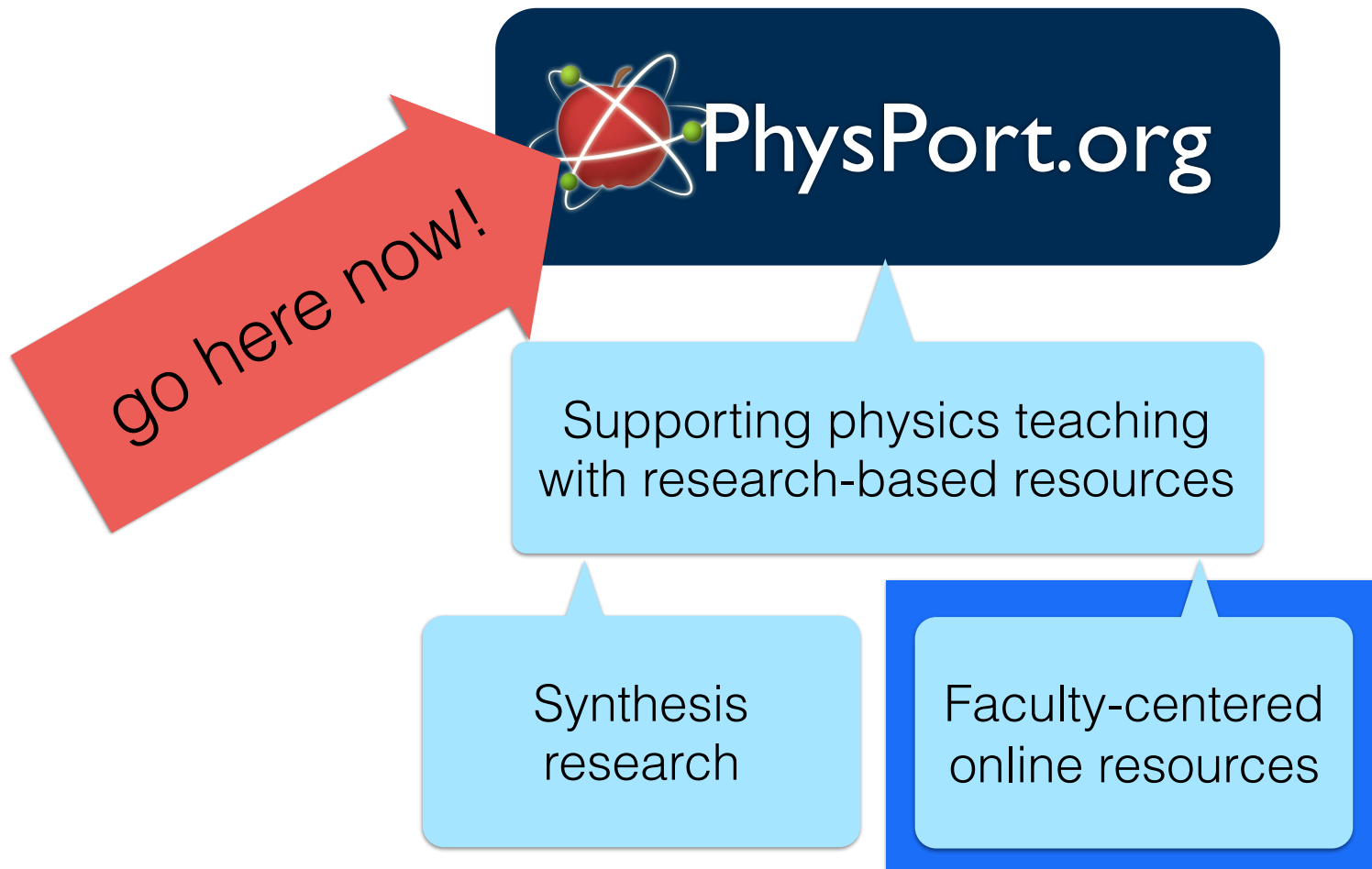
There is no single factor which causes or maintains the gap.

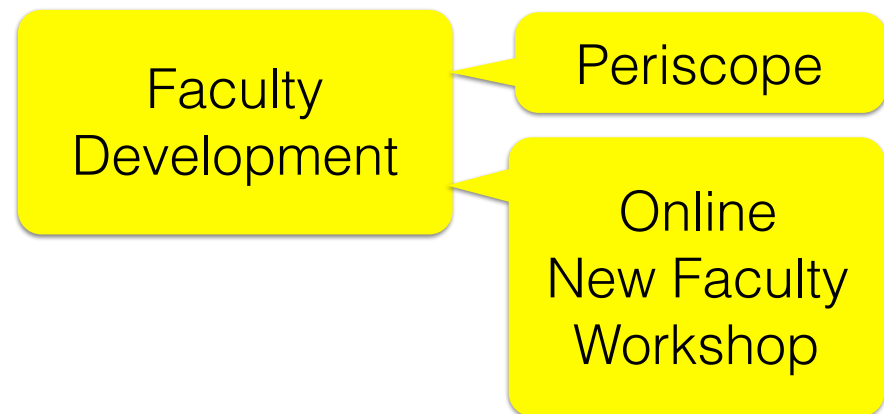
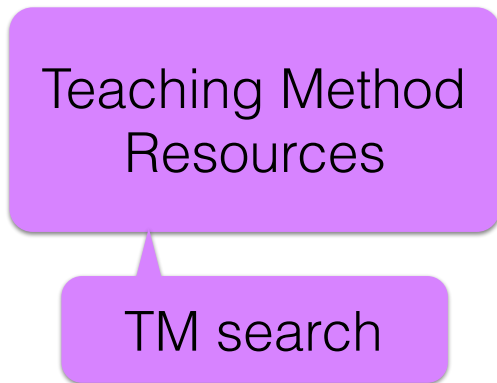
Bias can be subtle. Need process measures.



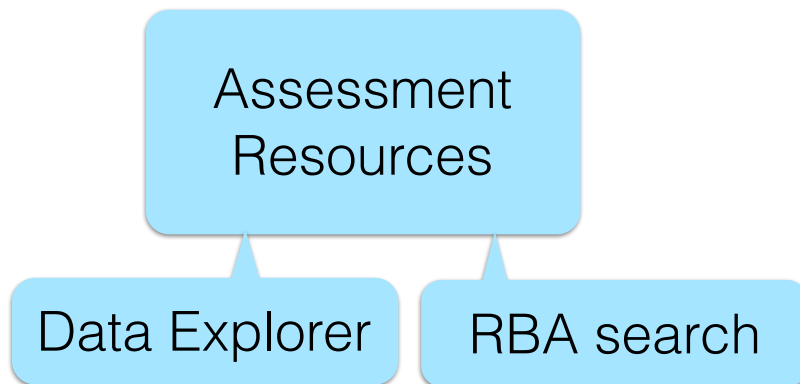
Madsen, A., McKagan, S. B., & Sayre, E. C. (2013). Gender gap on concept inventories in physics: What is consistent, what is inconsistent, and what factors influence the gap? *Physical Review Special Topics - Physics Education Research*, 9(2), 020121.







Faculty-centered online resources



Research and development process



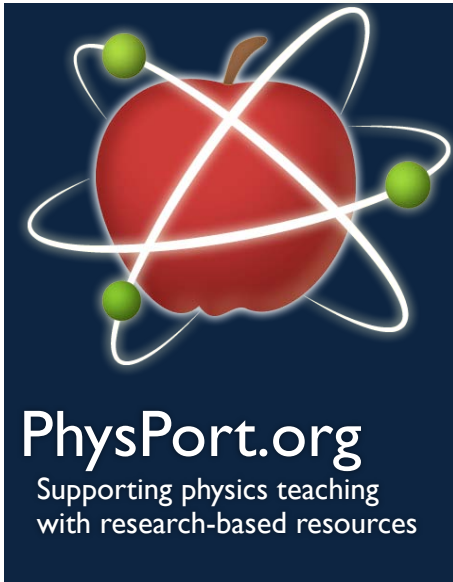
27 faculty & chairs

50 LA video project users

Faculty have practical needs.

Faculty want guidance.

Faculty consider broader contexts.



Start with the biggest needs of users.

The screenshot shows the PhysPort website interface. At the top left is the PhysPort logo with the tagline "Supporting physics teaching with research-based resources". On the top right are navigation links: "Admin | My Account | Logout" and "About Us | Contact Us", along with the AAPT logo. Below the header is a navigation bar with five tabs: "Home" (highlighted in red), "Expert Recommendations", "Teaching Methods", "Assessments", and "Workshops".

The main content area features a welcome message: "Welcome to PhysPort (formerly known as the PER User's Guide), the go-to place for physics faculty to find resources based on physics education research (PER) to support your teaching. [Learn more...](#)".

Below the welcome message are three columns of resources:

- Teaching**
I want to...
 - [find a new teaching method](#)
 - [get implementation help](#)
 - [learn more about research-based teaching](#)
- Assessment**
I want to...
 - [interpret assessment results](#)
 - [assess the impact of reforms](#)
 - [assess advanced physics content or skills](#)
- Troubleshooting**
I need help with...
 - [covering enough material](#)
 - [supporting group work](#)
 - [arguments for skeptical colleagues](#)

On the right side, there are social media icons for Facebook, Blogger, Twitter, and Email. Below these is a section titled "NEW - PhysPort Data Explorer" which displays a histogram for "Physics for Engineers Fall 2013 BEMA". The histogram shows the percentage of students versus normalized gain. A statistics box indicates: Mean: 0.30, Median: 0.33, Stdv: 0.22, N: 433 students. A green button labeled "Explore assessment data" is located below the histogram.

Below the data explorer is a section titled "Where can I find good questions to use with clickers or Peer Instruction?" by Sam McKagan, PhysPort director, dated September 26, 2016. It includes a small image of a classroom and text describing research-based teaching methods like Peer Instruction, CAE, Think-Pair-Share, and Technology Enhanced Formative Assessment. The text mentions that a challenge is finding and writing good questions and that the recommendation helps with this. The word "class." is partially visible at the end of the text.

At the bottom right, there is a section titled "Tutorials in Introductory..." with a clock icon and a share icon, and a small image of a classroom.

Expert Recommendations

physport.org/recommendations

Friendly articles that interpret and synthesize PER results for physics faculty.

The screenshot shows the PhysPort website interface. At the top, there is a dark blue header with the PhysPort logo and tagline "Supporting physics teaching with research-based resources" on the left, and navigation links "Admin | My Account | Logout" and "About Us | Contact Us" on the right, along with the AAPT logo. Below the header is a horizontal menu with buttons for "Home", "Expert Recommendations" (which is highlighted in red), "Teaching Methods", "Assessments", and "Workshops". The main content area is titled "Expert Recommendations" and features a "FEATURED" section with an article titled "Addressing common concerns about concept inventories" by Adrian Madsen, Sam McKagan, and Eleanor Sayre, dated July 8, 2016. The article includes a small image of a hand pointing at a document and a "Read more »" link. To the right of the featured article are two smaller article teasers: "Where can I find good activities for small group discussions?" and "Where can I find good questions to use with clickers or Peer Instruction?". On the far right, there is a "Most Popular" section with two article teasers: "Normalized gain: What is it and when and how should I use it?" and "Arguments for skeptical colleagues". Below these is a "View all »" link. At the bottom right, there is a "Tags" section with a list of tags including "active learning", "assessment", "best practices", "clickers", "concept inventories", "cooperative groups", "Peer Instruction", "PhET Interactive Simulations", "physics education", "research", and "teaching".

PhysPort
Supporting physics teaching with research-based resources

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AAPT


Home | **Expert Recommendations** | Teaching Methods | Assessments | Workshops

Expert Recommendations

FEATURED

Addressing common concerns about concept inventories

by Adrian Madsen, Sam McKagan and Eleanor Sayre July 8, 2016



Concept inventories are useful for assessing the effectiveness of your teaching, but as you use them, concerns and questions often come up. Here we discuss some common concerns about using concept inventories and related research that addresses these concerns.

[Read more »](#)

[assessment](#), [concept inventories](#)

Where can I find good activities for small group discussions?

by Sam McKagan, PhysPort director

Where can I find good questions to use with clickers or Peer Instruction?

by Sam McKagan, PhysPort director

How can I get students to have productive discussions of clicker questions?

by Jenny Knight and Sarah Wise, University of Colorado - Boulder

Most Popular

Normalized gain: What is it and when and how should I use it?

Arguments for skeptical colleagues

How can I design an effective in-class student worksheet for PhET simulations?

[View all »](#)

Tags

[active learning](#) [assessment](#) [best practices](#) [clickers](#) [concept inventories](#) [cooperative groups](#) [Peer Instruction](#) [PhET Interactive Simulations](#) [physics education](#) [research](#) [teaching](#)

Expert Recommendations physport.org/recommendations

Friendly articles that interpret and synthesize PER results for physics faculty.

- Big Ideas
 - Ten results of physics education research that every physics instructor should know
 - Arguments for skeptical colleagues
 - What makes research-based teaching methods in physics work?
 - Recursos en Español / Research-based teaching resources in Spanish

Expert Recommendations physport.org/recommendations

Friendly articles that interpret and synthesize PER results for physics faculty.

- Big Ideas
- Assessment issues
 - How do I get my students to take concept inventories seriously?
 - Guidelines for administering concept inventories online
 - How can I get my students' answers to concept inventories into electronic spreadsheets?
 - Effect size: What is it and when and how should I use it?
 - Normalized gain: What is it and when and how should I use it?

Expert Recommendations physport.org/recommendations

Friendly articles that interpret and synthesize PER results for physics faculty.

- Big Ideas
- Assessment issues
- Teaching method help
 - Where can I learn more about research-based teaching in physics?
 - How can I get students to have productive discussions of clicker questions?
 - Which polling method should I use for Peer Instruction?
 - How do I facilitate Tutorials in Introductory Physics?

Expert Recommendations physport.org/recommendations

Friendly articles that interpret and synthesize PER results for physics faculty.

- Big Ideas
- Assessment issues
- Teaching method help
- Teaching instructors
- Broader issues
 - What racial, gender, and sexual orientation bias still exists in physics and what can I do about it?
 - How can I set up an effective mentoring program to support students in my department?

Have a suggestion?

Want to contribute?

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smckagan@aapt.org

Teaching Methods

physport.org/methods/

Searchable, faculty-friendly guides to research-based teaching practices

PhysPort
Supporting physics teaching with research-based resources

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About Us | Contact Us

Home | Expert Recommendations | **Teaching Methods** | Assessments | Workshops

Teaching Methods and Materials

Tell us about your course to find methods relevant to you.

Any Subject | Any Level | Any Setting

Submit

Student Skills Developed ?
Any

- Conceptual understanding
- Problem-solving skills
- Lab skills
- Making real-world connections
- Using multiple representations
- Designing experiments
- Building models
- Metacognition

Instructor Effort Required ?
Any

- Low
- Medium
- High

Research Validation ?

- Gold star validation

55 Research-Based Methods

Sort by: Popularity

Peer Instruction

Small group discussion of conceptual questions interspersed with lectures, increasing engagement and providing formative feedback on student thinking.

Subject: +7

Level: MS HS IC IM UL GS O

Setting: +2

PhET Interactive Simulations

Open-ended game-like simulations that include expert visual models, enabling scientist-like exploration and real-world connections.

Subject: +6

Level: MS HS IC IM UL GS O

Setting: +4

- Type of method
- Level & Setting
- Coverage & Topics
- Instructor Effort
- Research validation
- Compatible methods
- Similar methods
- More information

Curricular elements: ComPADRE

- Collections of teaching materials
- Free.
- Intro, upper division, astro, IPLS.... etc
- Simulations, tutorials, clicker questions, ebooks.... etc

ComPADRE is
PhysPort's parent.

Open Source Physics


www.compadre.org/osp/


OSP
open source physics


Welcome Eleanor Sayre (le@zaposa.com) - [my profile](#) - [AAPT link](#) - [logout](#)
[filing cabinet](#) - [suggest a resource](#) - [administrators](#)

Search the OSP Collection.

- SIMULATIONS**
- EJS MODELING**
- CURRICULUM**
- PROGRAMMING**
- TOOLS**
- JS/HTML MATERIALS**
- BROWSE MATERIALS**
- RELATED SITES**
- DISCUSSION**
- ABOUT OSP**


Science SPORE Prize
November 2011





Computational Resources for Teaching

The **OSP Collection** provides curriculum resources that engage students in physics, computation, and computer modeling. Computational physics and computer modeling provide students with new ways to understand, describe, explain, and predict physical phenomena. Browse the [OSP simulations](#) or learn more about our tools and curriculum pieces below.

Tracker

The Tracker tool extends traditional video analysis by enabling users to create particle models based on Newton's laws. Because models synchronize with and draw themselves right on videos of real-world objects, students can test models experimentally by direct visual inspection.

[Learn more about Tracker](#)

EJS Modeling

Student modeling, the guided exploration of physical systems and concepts, is a powerful approach to engaged learning. Easy Java Simulations provides the computational tools for students and faculty to explore physics without the need for learning details of java programming.

[Learn more about EJS](#)

Programming

Open Source Physics provides extensive resources for computational physics and physics simulations. Included are:


Newest OSP Materials

- May 26 [Physlet@ Waves and Oscillations Problems Package](#)
- May 24 [Physlet@ Physics Periodic Motion Problems JS Package](#)
- May 13 [Solar and Lunar Eclipse JS Model](#)
- Apr 24 [Celestial Sphere with Analemma JS Model](#)

Recently Updated Materials


- Jun 10 [STP Textbook Chapter 9: Critical Phenomena](#)
- Jun 10 [STP Textbook Errata supplement](#)
- May 8 [Two-Body Orbits JS Model](#)
- Mar 20 [Open Source Physics Users Guide supplement](#)

Featured Tracker Package



Advanced Labs


www.compadre.org/advlabs/



Advanced Labs


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[filling cabinet](#) - [suggest a resource](#) - [administrate](#)

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Information Exchange

- [Lab Manuals](#)
- [Software](#)
- [Supplements](#)




News and Events








[AAPT Summer Meeting 2017](#)

Preparations are underway for the AAPT Summer meeting in Cincinnati, Ohio (July 22-26, 2017). The meeting will be held at the RiverCenter Convention Center. The main conference hotel is the Marriott Cincinnati RiverCenter. .




Featured Folders

-  [AAPT 2013 Advanced Labs Workshop](#)
 - Low-Cost Capacitance Profiling of a Semiconductor
 - Multimode fiber optics
 - Temperature Dependent Lifetime Measurements of Fluorescence from a Phosphor
 - Cosmic Ray Statistics using LabVIEW
 - 532 nm Laser Lab
-  [AAPT 2012 Advanced Labs Workshop](#)
-  [AAPT 2011 Advanced Labs Workshop](#)
-  [AAPT 2010 Advanced Labs Workshop](#)



Recently Added Materials

- May 10 [Interferometric Faraday effect magnetic field measurements](#)
- May 10 [Interferometric Faraday effect magnetic field measurements](#)
- May 10 [Spin Noise Spectroscopy in Rb Vapor](#)
- May 10 [2016 AAPT-ALPhA Award Lab Manual](#)
- Apr 26 [2016 AAPT-ALPhA Award - The Hong-Ou-Mandel Effect](#)
- Apr 25 [2015 AAPT-ALPhA Award - Mechanical Chaotic Oscillator](#)
- Apr 25 [Investigating student ownership of projects in an upper-division physics lab course](#)



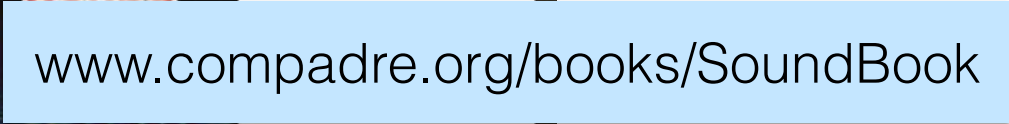
Interactive eBooks

Sound: An Interactive eBook *by Kyle Forinash and Wolfgang Christian* Hosted by AAPT ComPADRE

1. Physics of Vibrations 2. Waves 3. Sound and Perception 4. Electromagnetism and...

Sound: An Interactive eBook

This book consists of 33 interactive simulations which require the reader to click buttons, move sliders, etc. in order to answer questions about the behavior of waves in particular. There are dozens of links to other online resources and other online resources that pertain to the topics covered as well as sound clips for use in laboratory exercises. This book is a fascinating subject for music. The goal was to create engaging text that takes the strengths of print textbooks and the dynamics possible with interactive simulations to engage the student in actual




Waves: An Interactive Tutorial *by Kyle Forinash and Wolfgang Christian* Hosted by AAPT ComPADRE

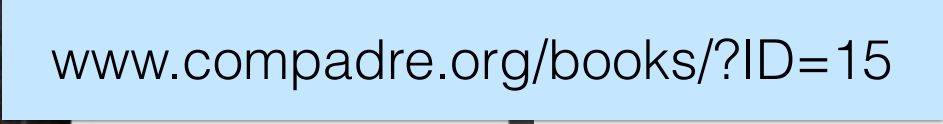
1. Basic Properties 2. Combining Waves 3. External Interactions 4. Applications

Waves: An Interactive Tutorial

This online book uses a series of tutorials based on interactive simulations and animations to explore the physics of waves. Students develop their understanding of waves through guided questions and exercises based on these simulations.



This is a set of interactive tutorials designed to teach the fundamentals of wave dynamics. It starts with very simple wave



Filing cabinet

bit.ly/compadre-nfw



The screenshot shows the AAPT ComPADRE website interface. At the top, there is a navigation bar with the AAPT logo and 'ComPADRE Resources and services for Physics Education'. Below this is a secondary navigation bar with links for 'The AAPT ComPADRE Collections', 'Events', 'Collaboration', 'Find a Resource...', 'Search', and 'Advanced'. A third navigation bar contains 'About', 'History', and 'Contact Us'. The main content area shows a breadcrumb trail: 'home » Member Directory » Bruce, ComPADRE Dir » Shared Folders » Folder'. Below this, there is a list of folders under the heading 'Bruce, ComPADRE Dir's Shared Folder'. The folder 'New Faculty Workshop - Digital Libraries' is highlighted with a red rectangular box. Below the highlighted folder, there is a description: 'New Faculty Workshop - Digital Libraries (4 resources, 10 subfolders) This folder contains materials for participants in the the New Faculty Workshop. These materials are updated for each workshop, with new highlights added from time to time. The folders below sort the content by subject and type.' Two subfolders are listed: 'Interactive Video Vignettes' and 'PhET: Physics Education Technology'. Each subfolder has a brief description and links to 'details' and 'website'. The PhET subfolder includes a small image of the PhET logo.

- NFW collection
- Make your own collections!



Assessment Resources

physport.org/assessments

PhysPort
Supporting physics teaching with research-based resources

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Home Expert Recommendations Teaching Methods **Assessments** Workshops

Browse Assessments

Tell us about your course to find assessments relevant to you.

Any Subject Any Level Submit

Assessment Focus
Any

- Content knowledge
- Problem-solving
- Scientific reasoning
- Lab skills
- Beliefs / Attitudes
- Interactive teaching

Format
Any

- Pre/post ?
- Multiple-choice
- Multiple-response ?
- Agree/disagree ?
- Short answer
- Rubric ?
- Observation protocol ?

Research Validation ?

- Gold star validation
- Silver validation
- Bronze validation
- Research-based

Translations

82 Research-Based Assessments

Sort by: Research validator

- Force Concept Inventory (FCI)**
Mechanics Content knowledge (forces, kinematics)
Levels: Intro college, High school
Formats: Pre/post, Multiple-choice
30 min
- Colorado Learning Attitudes about Science Survey (CLASS)**
Beliefs / Attitudes (epistemological beliefs)
Levels: Upper-level, Intermediate, Intro college, High school
Formats: Pre/post, Multiple-choice, Agree/disagree
8-10 min
- Brief Electricity and Magnetism Assessment (BEMA)**
Electricity / Magnetism Content knowledge (circuits, electrostatics, magnetic fields and forces)
Levels: Upper-level, Intro college
Formats: Pre/post, Multiple-choice
45 min
- Force and Motion Conceptual Evaluation (FMCE)**
Mechanics Content knowledge (kinematics, forces, energy, graphing)
35 min

- Search for RBAs
- Get administration details
- See sample questions
- See typical results
- Download RBAs
- Download usage guides

Verified educators!

For faculty and
teaching staff
free, easy

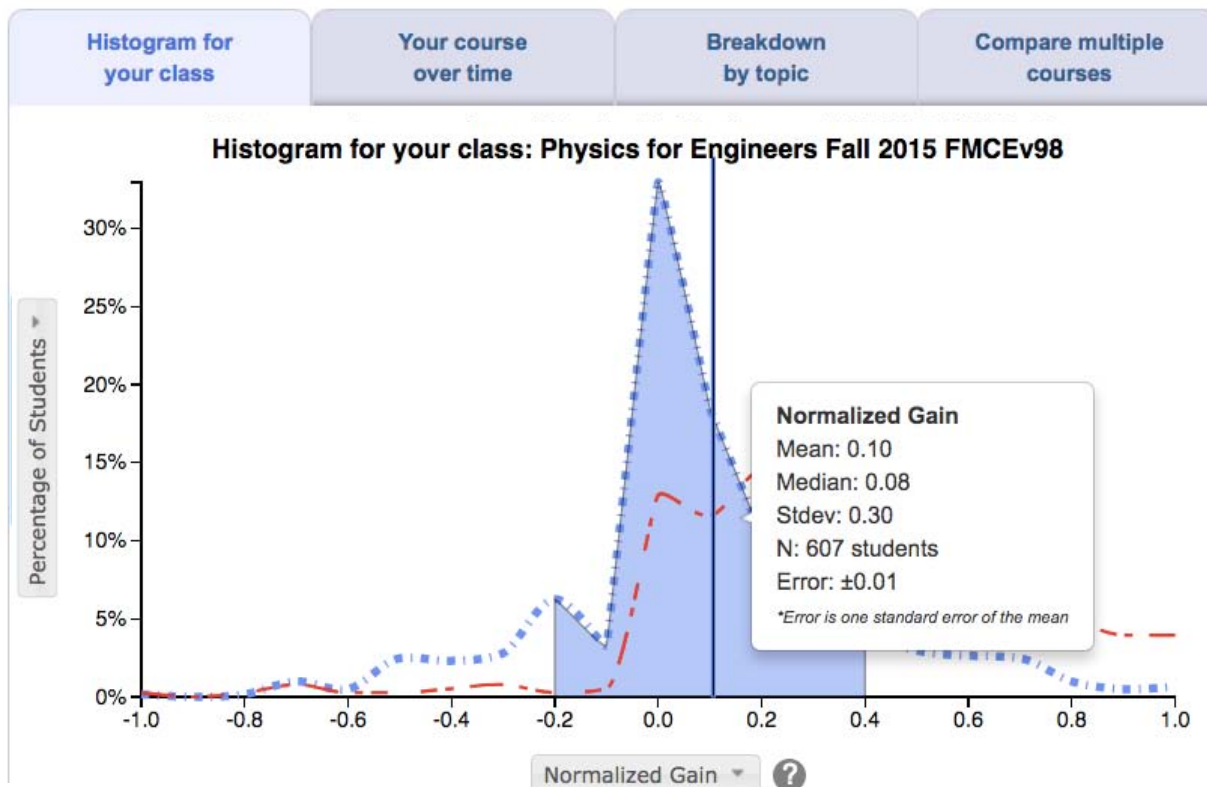
project info



Data Explorer

physport.org/DataExplorer

Visualize and compare your students' performance on research-based assessment instruments.



Upload your data

Explore your data

Download a report



Data Explorer

physport.org/DataExplorer



Secure

We use the same security measures used by banks and financial institutions

so you can have the utmost confidence that your data is safe.

- Your identity is protected
- Your students' identities are protected
- We use one-way, cryptographically-secure transformations
- We report on aggregate data



Data Explorer

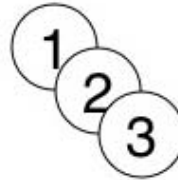
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- You can upload the files you already have*:
no need to use a template

*.csv, xls, or .xlsx; one assessment per file; one row per student



Data Explorer

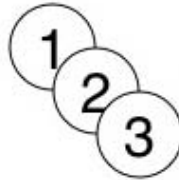
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to compare your data with classes and teachers in similar institutions nationwide.

- Explore responses on by questions or clusters
- Track your classes over time
- Split data by demographics
- Rigorous statistics done for you in the background



Data Explorer

- Compare multiple courses
- Track your courses over time
- Group and split by gender, major, section, instructor, etc
- Easy upload, automatic pre/post matching and scoring
- Download pdf reports for your tenure file
- Compare to national averages
- Coming soon: Add custom assessments

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Online workshops

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Video workshops for training teaching assistants and faculty professional development in best practices



The image shows a video player interface. The video title is "New Faculty Workshop - Introduction". The video content is split into two panels: the left panel shows a man speaking, and the right panel shows a large audience. Below the video player, there is a description of the workshop and a list of features.

APPT Virtual New Faculty Workshop

What is the Virtual New Faculty Workshop?

Videos of presentations from the live Workshop for New Faculty in Physics and Astronomy feature:

- leaders in physics education research and curriculum development
- teaching techniques proven to work in many environments
- cutting-edge developments in physics/astronomy curriculum and pedagogy

Techniques for all size classes

Learner-Centered Instruction in Physics and Astronomy
Dr. Edward Phelan, University of Arizona

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Online workshops

physport.org/workshops

Video workshops for training teaching assistants and faculty professional development in best practices

Virtual New Faculty Workshop
What is the Virtual New Faculty Workshop?
Videos of presentations from the live Workshop for New Faculty

Periscope: Looking into Learning
What is Periscope?
A collection of lessons for faculty and LAs/TAs to:

- watch and discuss videos of best-practices physics classrooms
- apply lessons learned to actual teaching situations
- practice interpreting student behavior
- become more effective teachers

Find the Periscope video collection at <http://PhysPort.org/periscope>



Periscope

physport.org/periscope

Videos of students working with handouts for training TAs and faculty in best-practices.

How can I best facilitate a student discussion?

Part of the Periscope collection

What is Periscope?

[View Facilitators Guide](#)

- 1 Watch classroom video
- 2 Discuss in small groups
- 3 Discuss with whole group

Some physics classes intersperse collaborative work in small groups with whole-class discussions. The purpose of these whole-class discussions is for students to share their small group's work, appreciate other groups' work, and collaborate to increase everyone's understanding. How should instructors facilitate student discussions?



Download Lesson
[What's in this?](#)

Self Study

You can also use Periscope lessons for self-study by watching the video episode and reflecting on the sample discussion prompts. In this case, we recommend printing out the handout so that you can easily refer to it while watching the episode, or opening both the episode and the handout on a large screen.



This episode shows a group of about twenty students in a Modeling Instruction "board meeting," in which students who just presented their work share a question that came up for them in their analysis. Sample discussion prompts are about how the instructor facilitates the student discussion.

[Open handout in new window](#)

HANDOUT

How can I best facilitate a student discussion?

Introduction

Some physics classes intersperse collaborative work in small groups with whole-class discussions. The purpose of these whole-class discussions is for students to share their small group's work, appreciate other groups' work, and collaborate to increase everyone's understanding. How should instructors facilitate student discussions?



Episode: "Moving box"

This episode shows a group of about twenty students in a Modeling Instruction "board meeting," in which students who just presented their work share a question that came up for them in their analysis. Sample discussion prompts are about how the instructor facilitates the student discussion.

Task for students

(from University Modeling Instruction)

A block is placed against the vertical front of a cart as shown in the figure. What acceleration must the cart have so that block A does not fall? The coefficient of static friction between the block and the cart is μ_s .



Sample discussion prompts

1. **What did you observe** in this episode? Talk to your partners about what you saw.
2. The instructor (Leon) has been quiet for a while when Arden poses her question. **What does he do while he is not talking?** What message do you think his behavior sends?



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Periscope
Looking into learning
Episode 502: "Moving box"
FIU
0:00 / 2:39
Open handout in new window

This episode shows a group of about twenty students in a Modeling Instruction "board meeting," in which students who just presented their work share a question that came up for them in their analysis. Sample discussion prompts are about how the instructor facilitates the student discussion.



Periscope

physport.org/periscope

Videos of students working with handouts for training TAs and faculty in best-practices.

I want to lead a weekly TA/LA seminar	I want to lead a half-day TA/LA workshop	I want to prepare colleagues to use best practices
I want to prepare colleagues to design learning environments	I want to prepare colleagues to train TAs/LAs	I want to teach TAs/LAs what ideas students have about a particular physics topic
I want to teach TAs/LAs about a particular instructional method	I want to support underrepresented groups	I want to improve my own teaching



Available now!

54 lessons

Facilitators' Guide



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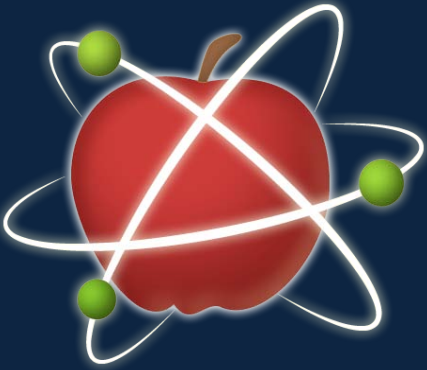
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Resources

- Synthesis research
- Expert recommendations
- Teaching method search
- Assessment search
- Data explorer
- Online workshops

PhysPort can help.





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