EP3: Effective Practices in Physics
Programs Guide

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Session Outline

1. Introductions
2. Motivation for an Effective Practices Guide
3. Effective Practices Guide
4. One Section: High School Physics Teacher Preparation
5. Feedback on Section
6. Feedback on the Guide
1. Had an external program review of your department?
2. Served as an external reviewer?
3. Rate your experience? (0-5)
4. Discussion: What would you like ideally to result from an external review?
Motivation

• How many would like your program to undergo accreditation?
• How many would like to have nationally-based arguments to increase resources?
• How many would like to convince your colleagues about the effectiveness of evidence-based practices?
1. Numerous requests to APS to provide service that ACS provides: Program approval (de facto accreditation)

2. Get effective practices into physics programs; promote the use of evidence-based curriculum: “Promote widespread use of evidence-based education practices throughout the undergraduate physics curriculum”

3. ABET has decided to provide accreditation for all science programs
Brief History

1. APS Committee on Education (COE) began investigations in 2012
2. Survey of department chairs
3. COE decision in 2015 to create Effective Practices Guide
4. Approval by APS Council November 2015
5. Task Force formed December 2016
6. Monthly meetings, 2 in-person meetings to define structure, policies, design, audience and scope
7. Progress:
   1. Have one approved section (of ~22)
   2. Three drafted (undergraduate research, career preparation, institutional partnerships)
   3. Two more being written (learning assistants, facilities)
   4. Approved Table of Contents (list of chapters, sections)
   5. Drafting assessment chapter (two more identified but not yet begun)
1. Develop a guide for self-assessment of undergraduate physics programs founded on documented best practices linked to measurable outcomes

The guide should provide a physics-community-based resource to assist programs in developing a culture of continuous self-improvement, in keeping with their individual mission, context, and institutional type. The guide should include considerations of curricula, pedagogy, advising, mentoring, recruitment and retention, research and internship opportunities, diversity, scientific skill development, career/workforce preparation, staffing, resources, and faculty professional development.

2. Recommend a plan for ongoing review and improvement of this guide under the oversight of the APS Committee on Education
BPUPP Task Force Members

**Co-Chair:** David Craig, Oregon State University
**Co-Chair:** Michael Jackson, Millersville University of Pennsylvania
- Noah Finkelstein, University of Colorado Boulder
- Courtney Lannert, Smith College and UMass Amherst
- Ramon Lopez, University of Texas at Arlington
- Willie Rockward, Morehouse College
- Gay Stewart, West Virginia University
- Gubbi Sudhakaran, University of Wisconsin-La Crosse
- Kathryn Svinarich, Kettering University
- Carl Wieman, Stanford University
- Lawrence Woolf, General Atomics Aeronautical Systems, Inc.

**Editorial Director:** Sam McKagan

**Staff Liaison:** Ted Hodapp; **Task Force Support:** Michelle Campbell

**AAPT Liaison:** Bob Hilborn

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Goals of this Program

Helping department chairs (and others) with:

• External program assessment (departmental review)
• Improve usefulness of assessment
• Bring together known literature on topics
• Collect practices recognized by the community as effective when there is insufficient evidence-based literature
• Encourage discussions in departments on continuous improvement of physics programs using evidence
• Provide a leverage point for departments to advocate for resources to improve the major
• Engage PER community on departmental needs
Department Chair Role Play

• What are the barriers to getting your department to improve its teacher education program?
  – Handout –

• As a chair, what appeals or fails to appeal about this presentation of the steps to improve teacher education in your department?

• How would you change it to make it more appealing / useful / practical?
Tentative Structure of Guide

Chapters:

• Introduction, how to navigate and use the guide
• Assessment: developing a useful and efficient culture of assessment
• Effective practices (~22 “sections”)
• Departmental leadership
• Departmental review:
  • Guide to reviewers
  • Preparing for a review
• Examples of student learning goals and program learning goals
Tentative Section List

- Capstone experiences
- Career preparation
- Communications skills
- Computational skills
- Departmental climate
- Equity, diversity, and inclusion
- Facilities
- Faculty development
- Implementing research-based instructional practices in your program
- Individuated degree tracks: engineering / applied physics
- Institutional partnerships: dual-degree physics / engineering programs
- Internships
- Introductory STEM major courses
- Laboratory / experimental skills
- Learning assistants
- Mentoring / advising
- Non-STEM major courses
- Online education
- Outreach
- Recruiting
- Retention
- Teacher preparation program
- Undergraduate research
- Upper-level physics courses
Feedback

- What is the most critical? (ranking task)
- What is missing from this list?
- Other comments?
What the Guide Is and Isn’t

Is:

• Collection of community knowledge and evidence-based practices
• Authored, reviewed, approved by the physics community
• Living document (not static), with stewardship by APS COE
• Ethics and diversity included throughout
• Effort to implement evidence-based pedagogy
• Transform mandatory assessment into useful exercise
• Suggestions on how to improve all aspects of a program
• Opportunities to bring education research to a broad community

Isn’t:

• Accreditation
• Mandate to conform
• Finished (yet)
References

**SPIN-UP 2002 (enrollment):**
aps.org/programs/education/undergrad/faculty/spinup/

**T-TEP 2012 (teacher education):**
phystec.org/webdocs/TaskForce.cfm

**Phys21 2016 (careers):**
compadre.org/phys21/

**Vision and Change 2011 (biology):**
visionandchange.org

**Active learning:**

**PTEPA (assessment):**
Physics Teacher Education Program Analysis: phystec.org/thriving
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