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Best Practices for Undergraduate Physics Programs
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
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www.aps.org/bpupp
What BPUPP is Doing

Designing a process to help department chairs with:

- Periodic program assessment (departmental review)
- Improve usefulness of assessment
- Bring together known literature on topics, and practices recognized by the community as effective when there is insufficient evidence-based knowledge about topics
- Encourage discussions in departments on continuous improvement of physics major using evidence-based methods
- Provide a leverage point for departments to advocate for resources to improve the major
- Engage PER community on departmental needs
Effective practices are defined as specific actions that programs can take that address the question, “How might a program achieve goal X.”

- **Effective practices use actionable verbs which suggest a specific action.**

- **Effective practices should be documented as likely to support programs in achieving excellence.** They are based on the best available information, which may range from research published in peer-reviewed journals to community recognition of practices that programs have successfully implemented to achieve their goals.

- **Effective practices do not need to be universal effective practices; they are context dependent.** Programs need flexibility to prioritize and adapt to their individual goals, environments, resources, and constraints. The term “effective practices” recognizes that there is no single best practice for every context, and there are many ways to accomplish a particular goal.
What BPUPP is Not

It is not accreditation:

- But ABET’s Applied and Natural Science Accreditation Commission is looking to accredit natural science programs and math programs (geology at Univ. of Arkansas last year).

It is not a ‘to-do’ list departments are required to complete
Tentative Structure of Guide

• Executive summary and introduction,
• How to navigate and use the guide,
• Development and implementation of program self-assessment and review plans and processes, and
• Sections of interest to many physics departments
  o High School Physics Teacher Preparation
  o Undergraduate Research
  o Career Preparation
  o Department Leadership
  o Recruitment
  o Retention
1. **Description**: Two sentence description/overview - what is this section about?

2. **Benefits to the Program**: Two-three sentence narrative that answers these questions: What goals / objectives / initiatives are these effective practices helping the program achieve? Why should programs be interested in this section?

3. List of known **effective practices**. For each practice:
   a. List of (up to ~6) general themes or groupings of effective practices.
      i. Each theme would contain a listing of effective practices (labeled alphabetically, e.g., a, b, c; up to ~3 per theme) written as brief stand-alone actionable items a program can do.
         1) Each effective practice should contain one or more implementation strategies with further information describing how to implement them.

4. **Programmatic assessments**: List of ~3-5 assessments that would help the program gauge their success within an area of this section. For each assessment, techniques and/or types of information are identified that programs can use to assess whether they are achieving the desired outcome.

5. **Evidence and Resources**: Includes some (~3-5) top-level resources for further reading that generally support the effective practices within the section.
High School Physics Teacher Preparation

Description
Physics programs are encouraged to implement, document, publicize, and support pathways to recruit and educate future high school teachers. This includes creating an environment within the program that promotes high school teaching as a valid and desirable career option for students.

Benefits to the Program

Effective Practices
1. Implement a teacher preparation pathway

Establish a degree track for high school teacher education within the major

1. In programs with one track, modify the existing degree to allow certification requirements
2. In programs with multiple tracks, design a teaching track to allow students to smoothly transition among degree options (should be perceived as on par with other career options)
3. Collaborate with School of Education or its equivalent to accurately communicate required components for licensure (curriculum, field experiences, testing, etc.) to students
4. Design the program (individually or with other science departments) in collaboration with the College of Education to meet licensure requirements
5. Learn from existing models, e.g., PhysTEC and UTeach employ practices and strategies for recruiting, preparing, and supporting teachers that begin within the physics program
6. Be mindful not to add extra expense or time to graduation

Understand alternate pathways to teacher certification

Support recent graduates during their transition into the classroom
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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:
PhysPort: https://www.physport.org/