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PROMOTING PEOPLE IN PHYSICS

2018 Chairs Conference

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College Park, Maryland

A New Guide to Effective Practices and Departmental Review – EP3: Effective Practices for Physics Programs

APS physics

Michael Jackson

College of Science and Technology

Millersville University of Pennsylvania

Initial Inquiry

- 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?
- How many of you love assessment?

  How many would like to have guidance on how to perform assessment (so that you don't have to re-invent the wheel)?
- How many would like physicists to review your program?
- What else would you find valuable in such a guide (up to 3 items)?
- What do you want such a guide to avoid (up to 3 items)?

Outcomes of the EP3 Guide

Help department chairs (& other program leaders)

- **Documented**: Bring together known literature of effective practices
- **Accepted**: Collect practices recognized by the community as effective when there is insufficient evidence-based literature
- **Advocate**: Collect information for departments to use in advocating for resources to improve their program
- **Usefulness**: Encourage discussions in departments on continuous improvement of physics programs using evidence
  - External program assessment and review; to improve usefulness of assessment
- **Needs**: Engage PER community on the needs departments have – what gaps are there in the literature?

Tonight

Our goals for tonight are:

- Become aware of this potentially transformative initiative
- Get to know the task force developing this and our forthcoming activities
- Gain an appreciation that outcomes are being designed to help programs and not to hinder or constrain programs
- Know who to contact with questions and input

EP3: Effective 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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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:** Numerous individuals

AAPT Liaison: Bob Hilborn

www.aps.org/bpupp

External Program Review

Motivation

How many of you have

1. had an external program review of your department?

   Rate your experience: (1 [ugh!] – 5 [fantastic!])

2. served as an external reviewer?

   Rate your experience: (1 [ugh!] – 5 [fantastic!])

3. All departments and programs undergo periodic review. What would you like to result from an external review?

Accreditation

How many would like your program to undergo accreditation?

ABET offers to accredit ***all*** natural science disciplines (ANSAC: Applied and **Natural** Science Accreditation Comm.)

ABET ACCREDITATION FOR NATURAL SCIENCE PROGRAMS

JOIN THE CONVERSATION

ABET accreditation has long been the global standard for programs in applied science, computing, engineering, and engineering technology. And recently programs that fall outside of these four main areas have shown interest in becoming ABET-accredited.

During this half-day, three-part session you will explore the value of ABET accreditation, and specifically the value that it could bring to the natural sciences. Presenters from ABET as well as industry and programs in physics, geology, biology, and chemistry will share their perspectives and describe how

External Program Review

Current situations department chairs face:

- **Wrong Place/Time**: The (unlucky) chair is tasked by the dean to prepare a set of materials for an external review
- **Meaningless**: External review is put on shelf (perhaps a few ideas are moved along), but it is a document unrelated to other department activities
- **Lack Expertise/Interest**: Assessments are done (e.g., Force Concept Inventory, ETS Major Field Exam), but no one is sure what to do with the results, what it means, or how it will impact teaching
  - Instructors continue to teach as they have – as there is no incentive to change
  - Courses taught as “independent” subjects, without coordination
  - Difficult to decide which innovations or changes might be positive, and which negatively impact the program

External Program Review

What EP3 guide will do for program review:

- **Useful**: Transform assessment into useful tools that physicists can understand and use to creatively improve programs
- **Streamline**: Provide a structure for assessment such that external reviews can be a compendium of annual assessments already demanded for regional accreditation – no new work required
- Reduce time needed to prepare for external review and accreditation materials
- **Advocate**: Aligns department with university vision/mission, provides strategy for broader discussions of program components and their value
- Provides the chair with evidence from published and community sources that he/she can use in advocating for resources
- **Beneficial**: Trains, and recognizes external reviewers who embrace a similar philosophy of evidence-based program improvement

Tentative Structure of the online EP3 Guide

Chapters:

- Introduction, how to navigate and use the guide
- **Assessment: developing a useful and efficient culture of assessment**
- Effective practices (~25 “sections”)
- **Departmental leadership**
- **Departmental review:**
  - **Guide to reviewers**
  - **Preparing for a review**
- *Appendices: Examples of student learning goals and program learning goals, assessment instruments, additional resources*

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Tentative Section List

- Capstone experiences
- *Career preparation*
- Communications skills
- Computational skills
- Departmental climate
- Equity, diversity, and inclusion
- Ethics
- *The physical environment: encouraging collaboration and learning*
- Faculty development
- Implementing research-based instructional practices
- 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
- Community engagement / outreach
- *Recruiting*
- *Retention*
- **Teacher preparation program**
- *Undergraduate research*
- Upper-level physics courses

Example Section: Motivation Teacher Preparation Programs

Current Situation a chairperson may face:

- **Expertise**: Lack of expert knowledge on how to create or improve a program
  - Unfamiliarity with published literature on the subject
  - Limited knowledge of assessments useful in gauging success
- **Mentor/Leadership**: Faculty "try" various things
- **Advocacy**: Chair unable to argue effectively for resources without a clear path, alignment with university strategic mission, documented benefits, or data to back ideas
- **Unattractive**: Lack of alignment with other programmatic aspects (or those of other departments)

Effective Practices: Elements of a typical section

Section Format

- Description (basic boundaries of the content)
- Benefits
- Effective practices subsection
  - Effective Practice Themes
    - ❑Actionable Practices
      - – Implementation strategies
- Programmatic assessments
- Evidence and resources

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Example Section: Outcomes Teacher Preparation Programs

What EP3 guide will do for building/improving programs:

- **Expertise**: Provide expert knowledge gathered from the physics community
- **Authoritative**: Provide an informed and endorsed (APS and AAPT) source of information
- **Accessible**: Communicated in jargon-free style for individuals unfamiliar with research or community knowledge of the subject
- **Practical**: Provide practical suggestions for implementation of components
- **Useful**: Prioritized set of actions
  - Provide resources for taking additional steps (this is not a compendium; the critical first steps for building/improving a program)
  - Describe assessments for evaluating strength of the program that can easily be adopted and whose value is recognizable and useful

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Effective Practices: Teacher Preparation Programs

http://apps3.aps.org/bpupp/

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

Effective Practices: Leadership Chapter

Possible themes within a Leadership chapter

- Understanding the responsibilities of the position
- Effective communication and facilitation
- Understanding of university procedures
- Advancement and advocacy of the program
- Developing a sense of community and affirming department culture
- Developing priorities, strategic initiatives, and a shared vision
- Developing strong working relationships within and outside the program/institution
- Strengthen the student experience
- Strengthen the faculty experience and shared governance

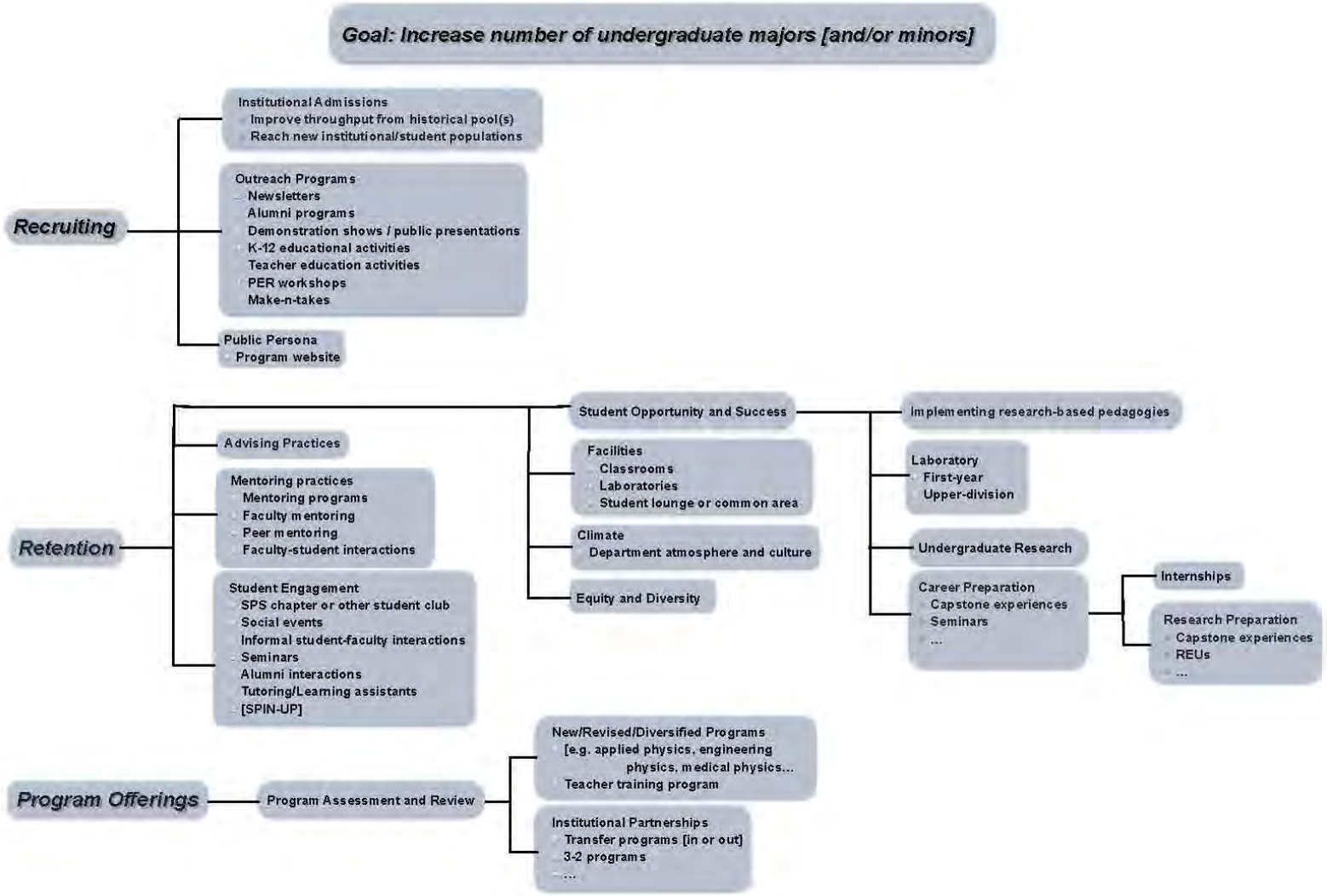
Effective Practices: Questions

1. What topics or themes would you like to see addressed in a Leadership chapter?

2. To assist individuals in navigating the guide, we will index some of the content around common questions chairs face, such as:
   a. How can we increase the number of students we graduate?
   b. How can we prepare for our next program review?

Do you have any recommendations for questions that we can use to assist individuals navigate the guide's content?

Effective Practices: Using Questions to Navigate: Goal Maps



What the EP3 Guide Is and Is NOT

- Collection of community knowledge and evidence-based practices
- Authored, reviewed, approved by physics community
- *Living* document (not static), with stewardship by APS COE
- Ethics and diversity included throughout – they are not add-ons!
- Primarily online
- Effort to implement evidence-based pedagogy
- Transform mandatory assessment into useful exercise
- Suggestions on how to improve all aspects of a program
- Opportunity to extend reach of education research

The EP3 guide is **NOT**

- Accreditation or Program certification
- Mandate to conform or a 'To-do' list departments are required to complete
- **Finished (yet)**

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More information?

Co-chairs:

- Mike Jackson (Michael.Jackson@millersville.edu)
- David Craig (craigda@lemoyne.edu)

Editorial Director: Sarah “Sam” McKagan (mckagan@aps.org)

APS Lead: Theodore Hodapp (hodapp@aps.org)

AAPT Liaison: Bob Hilborn (rhilborn@aapt.org)

Web Site: www.aps.org/bpupp

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References

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compadre.org/phys21/

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PTEPA (assessment):

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