

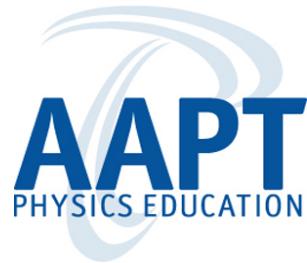
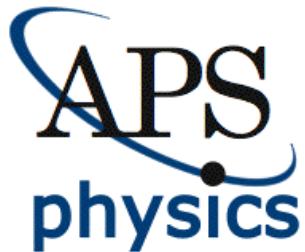


Effective
Practices
for Physics
Programs

APS Lunch and Learn

Improving and Supporting Physics Departments: Building a Comprehensive Guide of Effective Practices for Chairs

Theodore Hodapp
7 November 2020





- STB*: Requests to APS to do what ACS does: Program Certification
- 2012: APS leadership asks Committee on Education (COE) to investigate
- 2013: Working group formed to investigate
- 2014: Survey of physics chairs, report written
- 2015: COE discusses, makes recommendation to APS Council; ABET announces intention to accredit all fields of natural science; APS Council charges COE to form task force (BPUPP: "Best Practices for Undergraduate Physics Programs")
- 2016: APS COE begins process, drafts preliminary documents, recruits task force; Task force begins meeting
- 2017: Applied for funding, beginning drafts & discussions on underlying issues, determination of content & structure of guide, development
- 2018: NSF funding received, guide development commences
- 2019: Guide development
- 2020: Initial Rollout
- 2021: Total release, train reviewers
- 2022+: Update guide, new sections, evaluate review process

*Since Time Began



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**

Passed by the APS Council, November 2015



Who are we? Task Force Membership

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, Morgan State University
- 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 **Project Manager:** Kathryne Woodle

Staff Liaison: Ted Hodapp

Project Coordinator: Sean Costillo

AAPT Liaison: Bob Hilborn

External Evaluator: Stephanie Chasteen

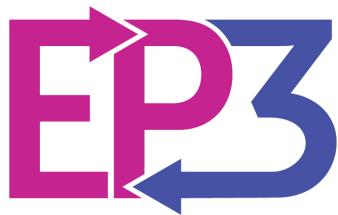
Research: C. Turpen, J. Corbo

Community Engagement: Joel Corbo



Who is it for?

- Physics department chairs
- Program leaders
- Programs undergoing a self-study and being reviewed
- Program reviewers
- Departments & faculty facing program challenges or interested in improving their programs
- Anyone in physics involved with student learning assessment
- Administrative leaders



Goals of the EP3 Guide

Help department chairs (& other program leaders)

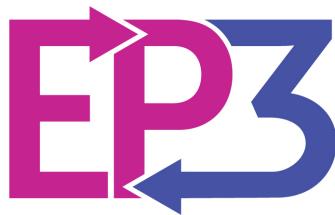
- Bring together known literature on topics
- Collect practices recognized by the community as effective when there is insufficient evidence-based literature
- Collect information for departments to use in advocating for resources to improve their program
- Encourage discussions in departments on continuous improvement of physics programs using evidence
- External program assessment / departmental review
- Improve usefulness of assessment
- Engage PER community on departmental needs



Structure of the Guide

Chapters:

- **Introduction:** how to navigate and use the guide
- **How to be an effective Chair**
- **How to create and sustain effective changes in your department**
- **Effective practices** (~25 “sections”)
- **Assessment of student learning:** developing a useful and efficient culture of assessment
- **Program review** and a Departmental Culture of Continuous Self-Improvement: Preparing for a self-study and program review as well as a Guide to reviewers
- **Strategic planning:** how to construct and use a strategic plan
- **Ancillary material:** Creating foundational documents; examples of student learning goals and program learning goals; assessment instruments; additional resources



EP3 Guide Section List

Students

- *Recruiting (in 1st release)*
- *Retention*
- *Advising and mentoring of students*
- Internships (to be included in 2nd release)
- *Undergraduate research*
- *Career preparation*

Curriculum

- *Implementing research-based instructional practices*
- *Introductory courses for physical science and engineering majors*
- Introductory courses for life sciences majors
- *Upper-level physics courses*
- Introductory courses for Non-STEM majors
- Communication skills
- *Laboratory / experimental skills*

- *Computational skills*
- Capstone experiences
- Online education

Programs

- Individuated degree tracks: engineering / applied physics
- Institutional partnerships: dual-degree physics / engineering programs
- *High school physics teacher preparation*
- Undergraduate instructional assistants
- Community engagement / outreach

Departmental

- Physical environment
- *Departmental climate and culture*
- *Equity, diversity, and inclusion*
- Ethics



Guide Development & Review

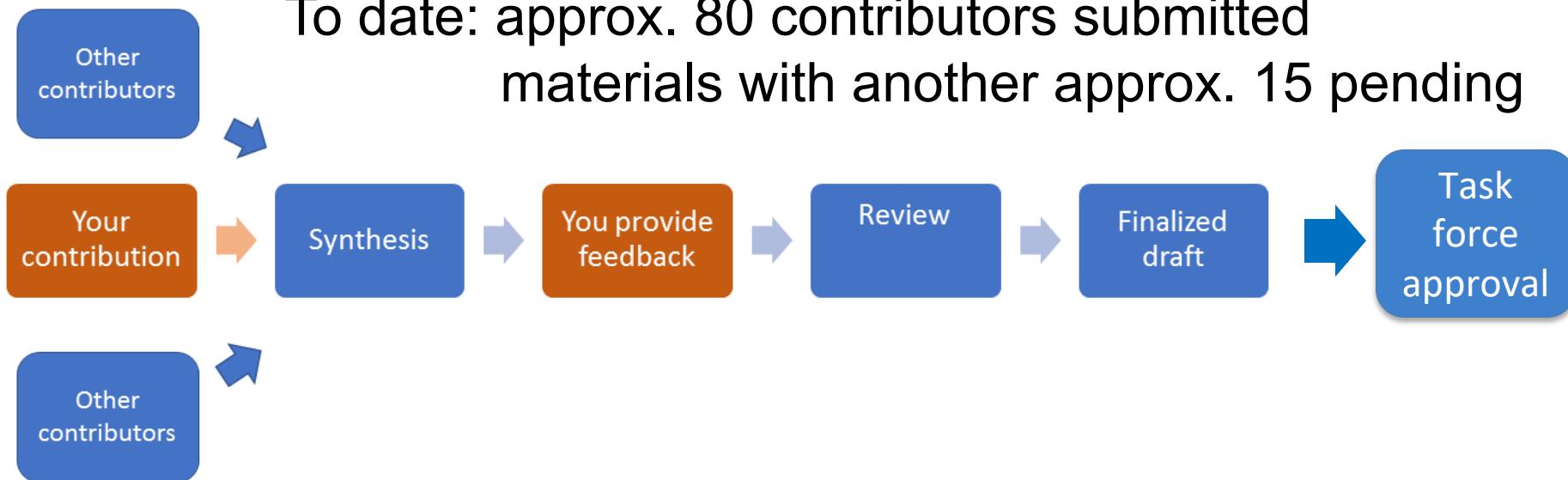
(13)

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To date: approx. 80 contributors submitted materials with another approx. 15 pending



For each section there will be several individuals (including yourself) contributing content

The task force and editorial director will then synthesize into one cohesive document.

We may have some additional questions for you. After internal vetting you will have a chance to see and comment on the synthesized section.

Each section will be sent for expert review to at least 4 individuals.

To see an example of a final section the Teacher Preparation can be found here: <http://apps3.aps.org/bpupp/>

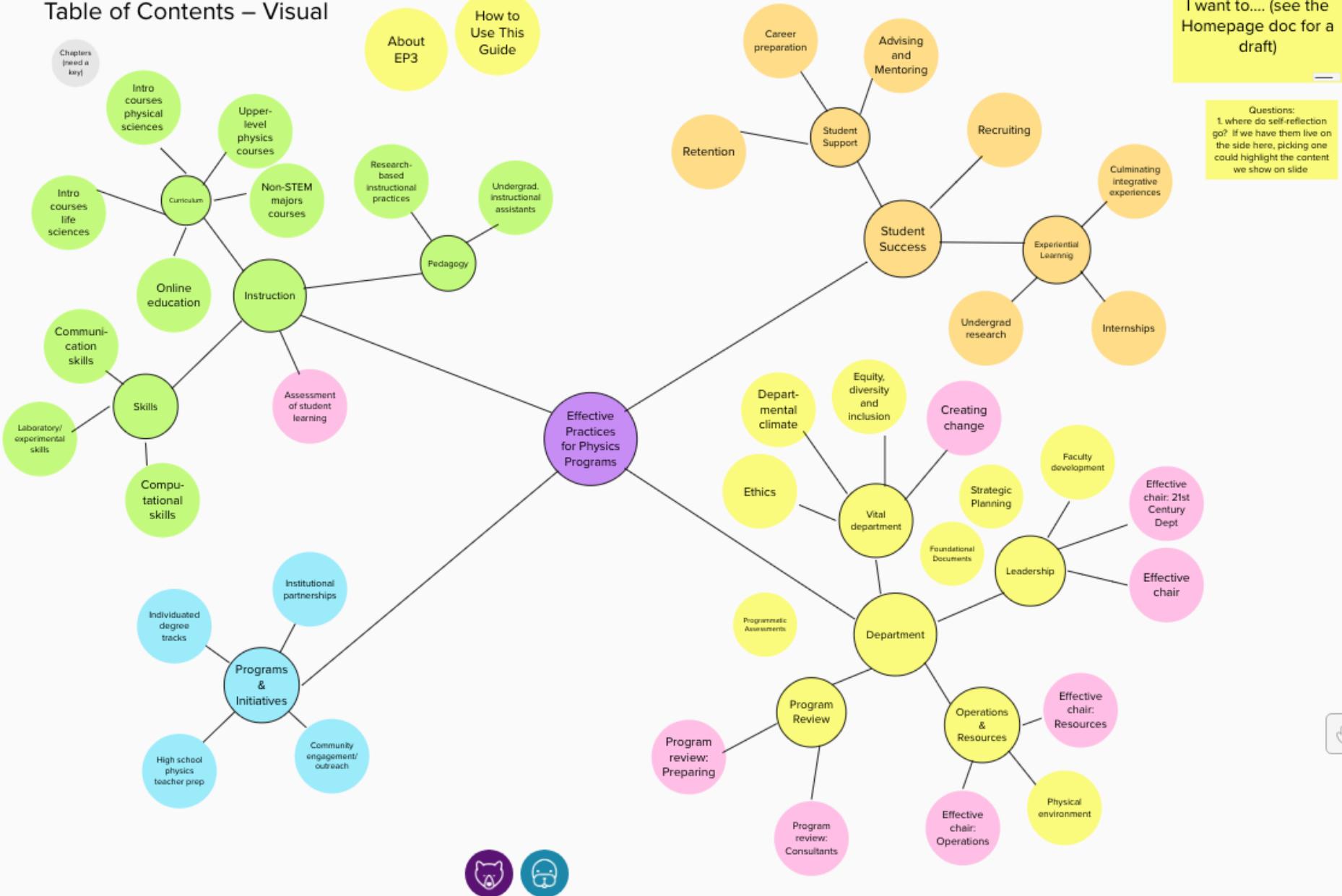


Example Content: Recruitment

1. Create and review a comprehensive and collaborative recruiting plan
 - A. Involve all members of your department and administration in the plan
 - i. Collaboratively engage and involve as many members of your program as possible to participate in recruiting activities, including full- and part-time faculty at all ranks, staff, and students.
 - ii. Partner with administration and campus offices who can contribute to and support the plan.
 - iii. Identify and recruit champions who can be strong advocates for, and drivers of, the plan.
 - iv. Incentivize participation in recruitment efforts, for example with a service award for students and with officially recognizing faculty time as service.
 - v. Support members of your program to participate in the plan in ways that most effectively use their strengths and interests.
 - B. Explicitly include strategies for recruiting and supporting students from groups that are underrepresented in your program
 - i. See the **Equity, Diversity, and Inclusion** section for suggestions on how to do this effectively.
 - ii. Recognize that if your efforts are successful at recruiting students who have not previously succeeded in your program, your faculty may face additional challenges, and plan to support faculty with those challenges.

6 Themes, 19 Effective Practices, 72 Implementation Strategies

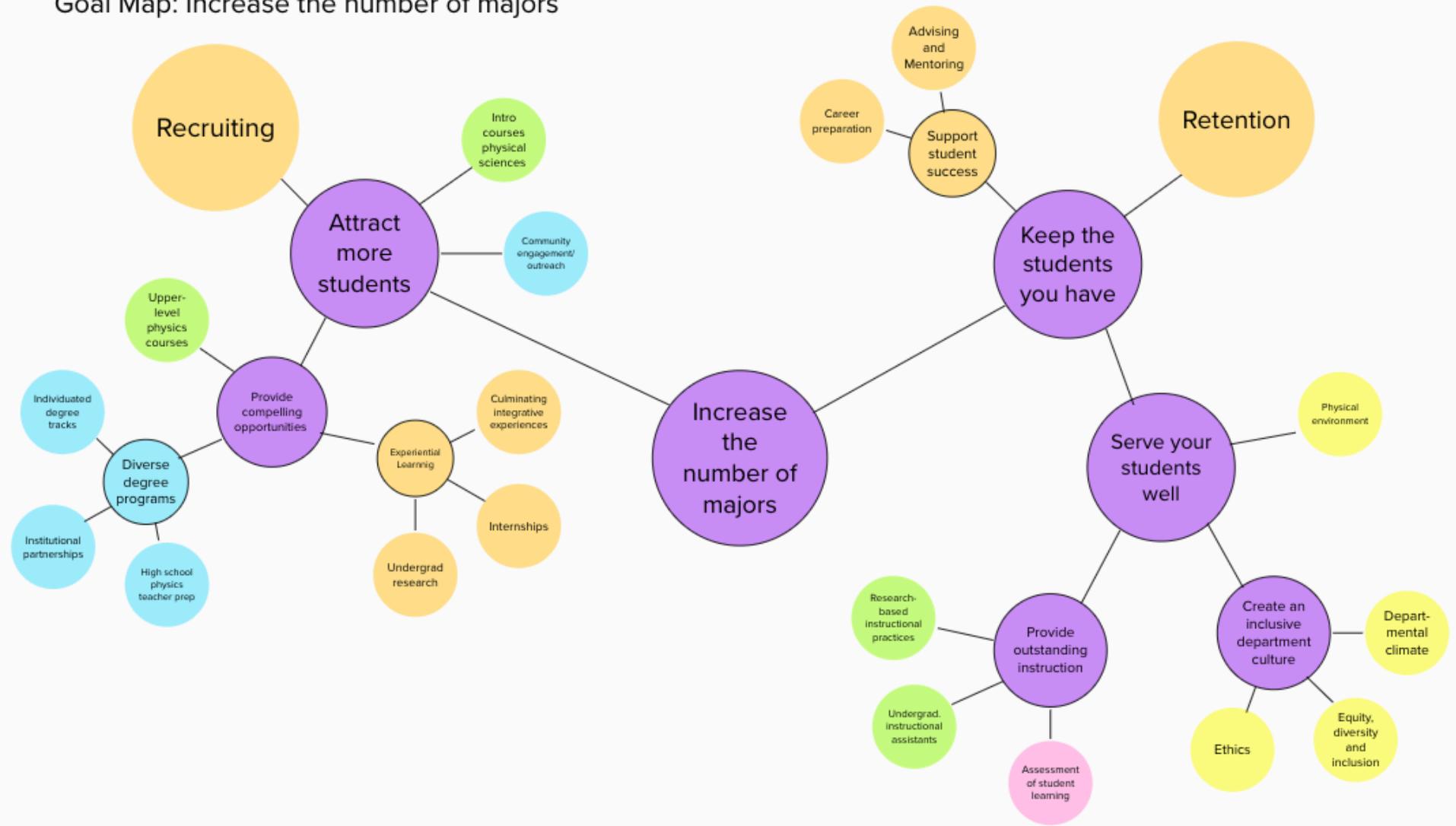
Table of Contents – Visual

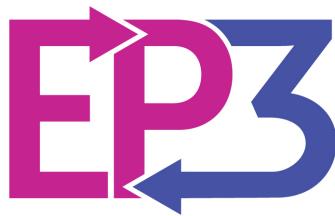


I want to.... (see the Homepage doc for a draft)

Questions:
1. where do self-reflection go? If we have them live on the side here, picking one could highlight the content we show on slide

Goal Map: Increase the number of majors





What the EP3 Guide Is

Is:

- Collection of community knowledge and evidence-based practices
- Authored, reviewed, approved by physics community (**>200!**)
- *Living* document (not static), with stewardship by an Editorial Board
- Primarily online
- Ethics and diversity included throughout
- Effort to encourage 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



What the EP3 Guide Is & Isn't

Is:

- **Key:** flexible, not prescriptive; mindful of local contexts
- **Tool to help departments understand who they are and what they want to be, and then provide community-based knowledge and information to help them achieve this**

Is NOT:

- Accreditation or program certification
- Mandate to conform
- A checklist of required actions
- Every possible idea for what to do (e.g., the ‘kitchen sink’)
- At the smallest level of detail to assist with implementation
- **Finished (yet)...**



Departmental Action Leadership Institutes (DALIs)

Direct, intensive support for departments facing a challenge or opportunity or wishing to make a major change

Examples:

- Increase enrollment and retention
- Develop shared mission/vision and plan for department's future
- Prepare for a department review
- Implement major recommendations of a program review
- Implement evidence-based instruction
- Improve department culture/climate
- Develop & implement program-level student learning assessment plan



Departmental Action Leadership Institutes (DALIs)

Activities:

- Create a departmental action team (DAT), charged with shepherding the change
- Train two faculty/staff to lead the DAT, assess and reflect on situations their departments face, engage in steps necessary for creating sustained change, and work with their DATs to achieve departmental goals
 - 2 representatives from each department
 - Bi-weekly video conferences
 - One-year commitment

Outcomes:

- **Develop capacity** to create and sustain changes: identifying goals and resources, developing plans, and implementing and assessing plans
- **Develop a culture** of continuous self-reflection, assessment, and improvement
- **Make meaningful progress** toward addressing challenges



Guidelines for undergraduate program review:

1. Undertaking a departmental review
 2. Advice to external consultants
-
- Reflects EP3 philosophy (cyclic review: experimentation, assessment, reflection)
 - Process designed to meet university accreditation requirements (reducing departmental workload)
 - Reflects effective practices of institutional change
 - Will be providing consultant training to conduct reviews



- Received funding to conduct 8 external site-visit reviews of HBCUs
- Fall 2021-Spring 2023
- Site visit team: HBCU Chair (different institution), APS Committee on Minorities member, EP3 leadership member
- Focusing on improving recruitment and retention of majors
- Feedback to EP3 on effective practices at HBCUs
- Strongly endorsed at HBCU Chair gathering (Spring 2020)

Contact Anne Kornahrens (kornahrens@aps.org) for more information



Departmental Toolkit

- Creating “Toolkit” to help departments take proactive actions to avoid closure or significant threat to educational mission
- Interviewing departments both successful and not who have faced these issues
- Integrating into EP3 Guide
- Initial release planned for January 2021, and APS Annual Leadership Meeting (open to all APS members)
- Funded by APS
- Co-authors: Jim Borgardt (Juniata), Courtney Lannert (Smith, UMass Amherst)
- Advisory Committee: Jesús Pando, Eric Brewe, Scott Franklin, Geraldine Cochran
- APS staff: Ted Hodapp, Anne Kornahrens, Sean Costello

45%

Fraction of
departments
under threat



1. Build website
2. Finish the Guide
3. Rollout to departments
4. Train reviewers
5. Develop process for COE to update the guide



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Any opinions, findings, and conclusions or recommendations expressed in this material are those of
the author(s) and do not necessarily reflect the views of the National Science Foundation.



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Q & A



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