

# PHYSTEC: BUILDING INSTITUTIONAL SUPPORT AND LEADERSHIP FOR TEACHER PREPARATION - BUILDING INSTITUTIONAL SUPPORT: LESSONS LEARNED FROM TWO PHYSICS SITES

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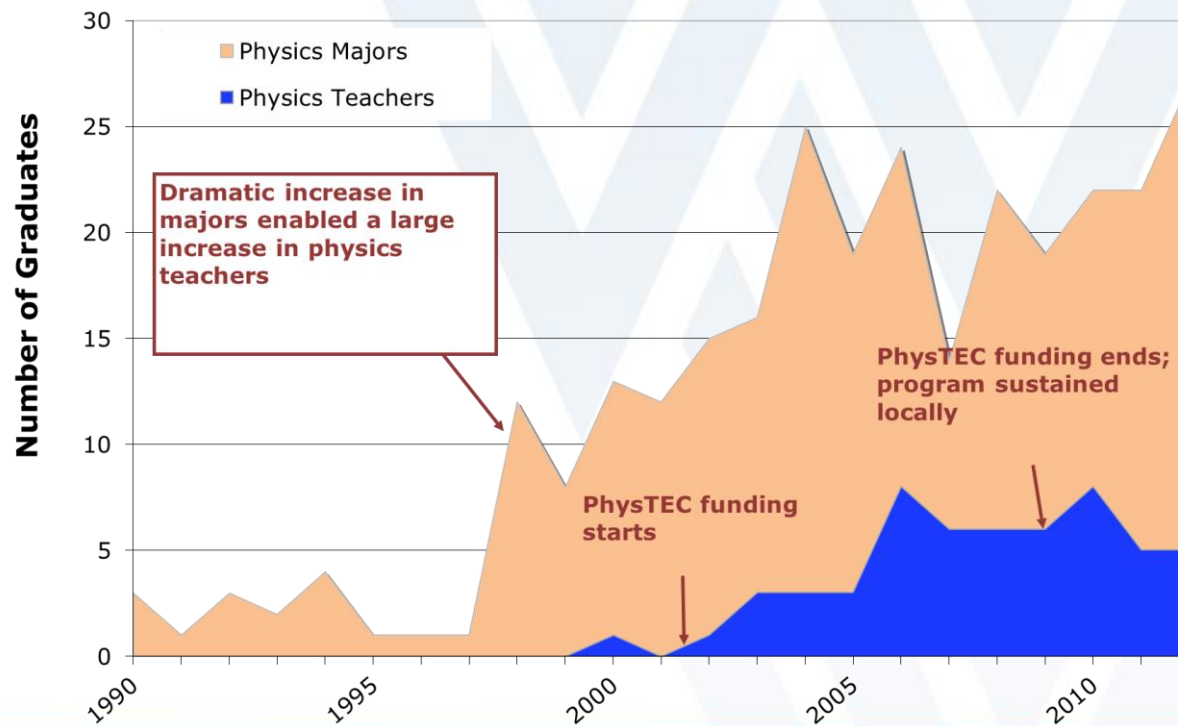
# BACKGROUND

- West Virginia University PhysTEC site (2016)
- WVUteach – West Virginia University UTeach replication site
- University of Arkansas PhysTEC Primary Program Institution (2001)
- UAteach – University of Arkansas UTeach replication site



# ARKANSAS PHYSTEC SITE

## The University of Arkansas Success Story



# INSTITUTIONAL SUPPORT – WHAT ARE YOU TRYING TO DO?

- Increase the number of high school physics teachers graduated through an existing certification path.
- Develop a new certification path better suited for physics majors.
- Implement a new teacher certification program.
- Provide support for students in your certification program.
- Recruit more students into your program.



# INSTITUTIONAL SUPPORT – WHO DO YOU NEED SUPPORT FROM?

- Colleagues in the physics department.
- Advisers in the physics department,
- The Chair of the physics department.
- The Chair of other STEM departments.
- The Dean of your college.
- The Dean of the college of education.
- The Dean of the college of engineering.
- The Provost or President.
- The Development Office.
- The state Department of Education or the Governor.



# YOUR PHYSICS COLLEAGUES

- Many physicists either explicitly or implicitly communicate negative attitudes about the high school teaching profession.
- These negative messages can have a serious negative effect on recruiting and retaining future teachers.
- It is particularly crippling if these attitudes are held by the primary advisers in your department.





# GET THE FACTS OUT

Get the  
Facts Out



[Home](#) [About](#)



[Becoming a Teacher](#)

[Recruiting Resources](#)

[Facts and Data](#)

[GFO Community](#)



**Teachers rate their lives better  
than all other occupation  
groups,  
trailing only physicians**



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# HELP THE ADVISORS

- Becoming a high school physics teachers requires a student to navigate a path with additional requirements beyond that of simply earning a physics degree.
- Advisers need some base knowledge of how that is done and need know how to direct a student interested in high school teaching. Not every adviser needs to be an expert, but the expertise needs to be somewhere in the department. There also needs to be a reliable method to connect the student with the expert (walking the student down the hall?). Do not leave this step up to the student.
- If your method is to send the student to the College of Education, you will graduate very few teachers.





# DEPARTMENTAL SELF-INTEREST

- Most physicists have spent very little time in the private sector and many departments struggle with the 43% of their graduates who do not seek additional education beyond the bachelors degree.
- High school teaching is an excellent outcome for physics majors (but the department may need convincing) who do not want to go to graduate school.
- High school teachers are high profile successful students that make the department and university look good (document this).



# TAKE PICTURES AND DISPLAY THE PICTURES

- To build support, you need to document success and make sure your colleagues are aware of these successes.



# DEPARTMENTAL SELF-INTEREST

- There is a keen awareness at the National Science Foundation of the value and critical shortage of highly trained STEM teachers.
- Proposals need Broader Impacts – supporting physics teacher preparation makes great broader impact.
- Helping a colleague with their broader impacts on a successful proposal will cement an ally for teacher preparation.





# DEPARTMENTAL SELF-INTEREST

Teacher preparation opens significant funding opportunities.

## Robert Noyce Teacher Scholarship Program



NOYCE SCHOLARS AND FELLOWS WERE AMONG THE OVER 600 ATTENDEES OF THE 2019 NOYCE SUMMIT IN WASHINGTON, DC – MICHAEL COLELLA



# DEPARTMENTAL SELF-INTEREST

**\*\*PRESS RELEASE\*\***

February 2019

## PhysTEC Recognizes Leaders in Physics Teacher Preparation

The Physics Teacher Education Coalition (PhysTEC) recently announced the newest inductees into “The 5+ Club”, a group of institutions that have graduated five or more physics teachers in a given year. Graduating five or more physics teachers a year is a significant achievement, helping to address the severe national shortage of high school physics teachers.

Most colleges and universities graduate fewer than two trained physics teachers a year, and the most common number of graduates is zero. In their 2014 report, the American Association for Employment in Education found that the teacher shortage in physics is number one among 59 education fields.

Teacher preparation can lead to significant recognition for the department.





# DEPARTMENTAL SELF-INTEREST

This different kind of recognition as fulfilling broader public service goals to the university and the state can bring positive interest at the Dean and Provost level to the department.

As a land-grant institution, the faculty, staff and students at West Virginia University commit to creating a diverse and inclusive culture that advances education, healthcare and prosperity for all by providing access and opportunity; by advancing high-impact research; and by leading transformation in West Virginia and the world through local, state and global engagement.



# WHY DO YOU NEED DEPARTMENTAL SUPPORT?

- Recruiting (and not negative recruiting).
- Advising
- Support for teacher friendly degree tracks.
- Support for reformed instruction or professional teaching faculty
- Support for teachers in residence (money)
- A positive departmental atmosphere for teachers
- Support for adjustments in workload to support the time this all takes.



# FLEXIBLE DEGREE PLANS

- If you are lucky enough to have a four-year undergraduate certification program or if you have to rely on a post-bach masters certification program; your students will generally have to take courses outside those generally required by physics degrees to complete the program or to qualify for the masters program.
- These extra courses need to fit into their four-year physics degree requirements. This will often require modifying degree plans (which may be resisted by faculty who *know* all students need two semesters of quantum mechanics).



Now let's move outside the department

# **BROADER INSTITUTIONAL SUPPORT**



# WHY DO YOU NEED BROADER INSTITUTIONAL SUPPORT?

- Financial support.
- Protection from changes which adversely affect physics teachers.
- Support for grant funded initiatives.
- Encouragement for within department activities.
- Partners to make changes to existing licensure programs.
- Partners to implement a new teacher certification program.
- Champions for existing teacher preparation programs.





# UPPER ADMINISTRATION

- Deans, Provosts, and Chancellors are important partners in good times and can help provide visibility for your program.
- They are critical in bad times, particularly if your programs have substantial costs.
- Prioritize developing a relationship. Document your successes, seek press coverage, keep them informed of funding success, invite them to events that celebrate your graduates (have such events), point them to honors won by your working teachers.
- This is a continuous process; administration changes often, you need support at multiple levels.



# THE COLLEGE OF EDUCATION

- At most institutions, the entity that actually certifies physics teachers is not the physics department or the College of Arts and Sciences. Often it is a College of Education.
- Physics (or even science) teachers will almost never be a substantial segment of their graduates who are almost certainly overwhelmingly elementary education majors.
- Things you ask of the College of Education are generally favors you cannot repay. It takes effort to develop a productive working relationship.



# CERTIFICATION

- Colleges of Education (COE) are responsible for certifying teachers.
- To productively work with a COE, you need to take the time to understand some of the constraints they are under.
- Certification is hard and complicated.
- The easiest way to satisfy certification requirements is to require a lot of courses. This can make it virtually impossible to graduate physics teachers.
- Small changes, unimportant to most COE graduates, can dramatically affect physics students' certification requirements.



# CERTIFICATION

- CAEP
- Council for the Accreditation of Educator Preparation
- The rules for certification are set by the state, often by selecting an external entity that established the requirements.



# CAEP STANDARD 1 (OF 5!)

- The provider ensures that candidates develop a deep understanding of the critical concepts and principles of their discipline and, by completion, are able to use discipline-specific practices flexibly to advance the learning of all students toward attainment of college- and career-readiness standards.

## **Candidate Knowledge, Skills, and Professional Dispositions**

- 1.1 Candidates demonstrate an understanding of the 10 InTASC standards at the appropriate progression level(s) in the following categories: the learner and learning; content; instructional practice; and professional responsibility. **CCSSO's Interstate Teacher Assessment and Support Consortium**





# CAEP STANDARD 1

## Provider Responsibilities

- 1.2 Providers ensure that completers use research and evidence to develop an understanding of the teaching profession and use both to measure their P-12 students' progress and their own professional practice.
- 1.3 Providers ensure that completers apply content and pedagogical knowledge as reflected in outcome assessments in response to standards of Specialized Professional Associations (SPA), the National Board for Professional Teaching Standards (NBPTS), states, or other accrediting bodies (e.g., National Association of Schools of Music – NASM). ([There are 2 more items in Standard 1](#))



# SPA

## Specialized Professional Associations

- Physics as a discipline abdicated on this one, but now NSTA has left CAEP, so there is much uncertainty!



# INTASC STANDARDS

- Standard #1: Learner Development. The teacher understands how learners grow and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences.
- Standard #2: Learning Differences. The teacher uses understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards. (lots more)



The Development Office

**MONEY**



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# SUSTAINABILITY

- Often teacher preparation programs are expensive requiring additional personnel lines and specialized classes.
- The best case is for the teacher preparation program to be fully integrated and sustained by the institution without outside support.
- However, the money needs to come from somewhere.





# THE DEVELOPMENT OFFICE

- One source of possible support is private funding.
- STEM teacher preparation efforts have broad public support and can be attractive programs for external (philanthropic) support.
- Universities have entire offices dedicated to raising money – do not try to fund raise yourself without contacting these folks.
- Universities are VERY touchy about their donors.



# CONCLUSION

- Physics teacher preparation is a complex enterprise requiring many partners.
- Developing those partners is key to successfully developing and sustaining a physics teacher preparation program.

