2020 PhysTEC Recruiting Site Sustainability Mini-Evaluation

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About this report

Executive Summary
  Recommendations

Full report
  Teacher graduation rates
  Reprise of 2018 evaluation results
  2020 written interview results
    Self-ratings
    Biggest supports and barriers
    Champion
    Enduring impacts
  Requests for PhysTEC
  Interpretation: What might lead to different levels of productivity?
    Universally true
    Less productive
    Productive during grant
    Productive during and after grant

Appendix: Written interview protocol
About this report

This study built upon the 2018 post-funding interview study in which 8 sites participated. This report investigated outcomes from the 7 of the 9 following Recruiting sites funded from 2014-2017:

1. Boise State University (UTeach replication 2012-2016)
2. Bowdoin College
3. East Tennessee State U.
4. Indiana U. South Bend
6. Salisbury University
7. University of Wyoming
8. Sonoma State University
9. U. Massachusetts Dartmouth

The award amount of these recruiting grants was $30,000, funding period was 3 years, and the support offered included an annual video call, the PhysTEC conference, and a dedicated meeting at the conference.

All sites are BS-granting institutions except for Northwestern Oklahoma, which offers only a physics minor. The mean and median number of physics majors graduating from each institution (averaged 2014-2018) is 11; all graduated 20 or fewer majors per year. The departments graduating fewer than 10 majors per year were East Tennessee State University, Indiana University South Bend, and U. Massachusetts Dartmouth. In general Recruiting sites are smaller departments than Targeted sites (which had more mixed long-term gains). In comparison, the Targeted legacy sites graduated 20 majors per year on average during this time period, many graduated 30 or more majors/year, and only two (Chicago State and SPU) graduated fewer than 10 majors in a year.

The evaluator and PhysTEC leadership decided to minimize time spent on this evaluation, for budgetary reasons and because it is already known that these sites did not receive the level of staff support which has become more customary in the project. Thus, the following efficiency measures were instituted:

1. Sites were asked to respond to a brief “written interview” protocol (see Appendix).
2. This report is a general, brief analysis of those written responses, and is thus a “mini evaluation” rather than a full, robust study.
Executive Summary

There was a small increase in graduation rates, on average. About half (N=4 out of 7) experienced increases in graduation rates during funding (+1.1 teachers/year on average). Due to post-funding drops in graduation rates, N=2 experienced increases in graduation rates pre-post funding (+1.8 teachers/year on average), a programmatically significant increase. Across all sites, the average increase in graduates pre-post funding was +0.4 teachers. Because of the low cost of the grants, this results in a cost-effective program of $1664 per year of teaching for Recruitment grants. Enhancing the numbers of sites experiencing positive gains would further enhance cost effectiveness.

All sites experienced tangible benefit from the grant regardless of enhancement of graduation rates. Durable impacts included prestige and recognition for physics teacher education, degree pathways, and active recruitment efforts. All sites indicated that PhysTEC positively impacted physics teacher education at their institution; on average they rated the impact as 80 (out of 100). They also indicated that engaging in PhysTEC is likely to lead to further future improvements, though less strongly so (average rating 65).

*It was a valuable and successful endeavor. The resources and guidance provided have improved the program, even as the amount of effort diminished. We are very satisfied with the experience.* - Site leader

*The secondary ed. degree has been raised in profile and is no longer an afterthought.* - Site leader.

The most common support that leaders indicated led to increasing the number of physics teacher graduates were recruiting activities (brochures, program publicity and branding, visiting classrooms to pitch the program) and structural supports (Education waiving prerequisites, additional funding). No site listed a TIR among the most important steps, though a few felt it was an important part of the program.

*As a faculty advisor for Physics majors, my experience w/ PhysTEC led me to be more active in trying to recruit majors into teaching.* - Site leader

The most common barriers cited were small numbers of majors (N=2 sites), and poor perceptions of teaching among students or the public (N=3).
Structural and cultural elements of the program were sustained, including a supportive culture in the institution or department (all sites), the program team (all sites), collaboration with education (all but 1 site), recruitment activities (all sites) and licensing pathways (all 3 sites which made changes); all in PTEPA Rubric Standards 1-3. Program assessment was not commonly maintained, and few changes were made to rewards or recognition, coursework, or community building.

All sites had some type of Champion, though the engagement of that champion varied. Many champions indicated that they are now distracted, or not vocal. The most productive sites had champions who were Chair at the time of the Recruitment Grant.

Enhancing graduation rates was often hampered by small numbers of majors, or poor perceptions of teaching as a profession. Using Get the Facts Out, and engaging in program-building activities, may help such sites. Those with small numbers of majors may also benefit from combining forces with other STEM departments. More productive grants were less hampered by these difficulties. More productive grants did not seem to be typified by more active or engaged champions, or stronger collaborations with Education.

Sites with the greatest gains were typified by a climate which supports teaching. Their activities also seemed to include particularly concrete, well-defined early teaching experiences which were sustained: Recruiting students to be paid planetarium presenters, encouraging students to take Methods course, and giving students stipends to engage in Step 1 courses.

Sites expressed appreciation to PhysTEC for this work, which they felt was important. They requested that PhysTEC create a short video about teaching (which is currently a project of Get the Facts Out), that they encourage collaboration between physics and education, that they financially support TIRs and early career teachers, and that they support state advocacy to support more reasonable licensing criteria.

I am thrilled to have an organization like PhysTEC championing this cause. - Site leader.

Recommendations

1. Continue to offer low-cost Recruiting grants and emphasize engagement by the Chair.
2. Continue to support the use of Get the Facts Out resources.
3. Track whether sites are on track to increase their graduates in each of the first two years of funding; if not, intervene with targeted help.
4. Identify states with unfavorable licensing requirements and focus efforts in those states on ameliorating the requirements (and perhaps not on recruiting teachers, yet.)
5. Consider screening grant recipients for (1) low numbers of majors, (2) poor climate for teaching improvements (SCII) and (3) lack of positive collaboration with Education. Have specific recommended strategies for those with these issues (e.g. partnering with other STEM departments; engaging in activities like the LA Program which have “ripple
effects” to improve the overall strength of the department; specific collaboration-building activities).

6. Encourage sites to develop concrete, well-defined recruitment activities which can sustain, and to seek structural supports (e.g. agreements with Education, future funding).

Full report

Teacher graduation rates

Recruiting grant graduation rates were analysed in the 2019 funded site graduation rate evaluation. Results for Recruiting grants (N=7) are reprised here. Note that these graduation results are based on the “funded plus one” period which includes the post-funding year 1 as a lagging indicator.

About half of recruiting grants (N=4) achieved increases in graduation rates from pre-to-during funding. For those 4 sites the increase is +1.1 graduates. This is a promising result.

Due to reduced graduation rates into the sustainability period, however, on average, Recruiting grants increased the number of graduates by +0.4 teachers over the pre-funding graduation rates. This is below the threshold of 0.5 to be considered a “true” graduation rate increase, but due to small N this conclusion can easily change. On a per-site basis, only N=2 sites achieved long-term increases in graduation rates. However, those 2 sites increased their graduates, on average, by +1.8 graduates, which is significant (both statistically and programmatically). Even though few sites achieved positive gains, this results in a cost-effective grant program ($1664 per year of teaching vs. $5432 for Comprehensive grants), and lower investment risk, due to the reduced cost of the grant and support.
Thus, rather than investigating the average graduation rate increase (+0.4) it is likely more informative to examine outcomes from the N=4 sites which experienced positive increases during the grant period, and N=2 sites which maintained positive increases past the grant period. How can these “positive deviants” inform the project about how to achieve similar positive results at smaller institutions and with smaller grants?

Reprise of 2018 evaluation results

This study built upon the 2018 post-funding interview study. Some main messages from that report included:

- Recruiting grant sites had positive outcomes.
- Recruiting sites which created new structures (such as resources, student stipends, degree pathways) tended to be maintained. Knowledge and capacity (e.g. awareness of PTE, leader knowledge) was also maintained.
- Items that tended not to be maintained were Teachers in Residence, and funding to attend conferences. Connections to Education, and early teaching experiences, were inconsistently maintained.
- Recruiting grants enabled site leaders to prioritize teacher education, but this momentum can fade.
- Site leaders need more guidance on using and maintaining teacher partners (such as TIRs).
- Site leaders gained knowledge at the PhysTEC conference and from other sites.
- Many sites lacked a positive ambassador for the teaching profession.
- Common challenges were the perceptions of teaching, small numbers of majors, and rural locations.
- Sites were challenged to offer early teaching experiences and physics pedagogical preparation.
- Many sites lost a reason to engage with Education once the grant ended.
- Many sites requested more ongoing communication and interaction with PhysTEC.

These results were used to help structure the new Recruiting RFP and support structures.
2020 written interview results

This section summarizes the results from the written interview. Sites were invited to have more than one person complete or review it; 6 out of 7 did so, likely resulting in more valid and robust responses.

I separate the sites into 3 types based on teacher graduation data:

1. **Less productive** (N=4)
2. **Productive during grant** (N=3)
3. **Productive during and after grant** (N=2)

Self-ratings

Each site was asked to rate the extent to which the following statements were true, using a scale from 0 to 100, where “0” is “not at all” and “100” is “completely”:

1. Engaging in PhysTEC impacted physics teacher education at your institution.
2. Engaging in PhysTEC is likely to lead to future improvements in physics teacher education at your institution.

Ratings were generally positive: The average was 80 for “impacted PTE at your institution” and 65 for “is likely to lead to future improvements.

I focus on “impacted PTE at institution” because this seemed the most consistently interpreted. The lowest rating was 60 (at one of the less productive institutions) and the highest was 100 (at one of the most productive institutions). Ratings varied widely, but the average for the “productive before and after grant” institutions was higher (90) than for the other institutions combined (76). Thus ratings were only somewhat aligned with the graduation rates; see below.
Thus, while outcomes varied, all institutions felt PTE was positively impacted by engagement in the Recruiting grant, and that the grant supported future improvements. Since results are only loosely connected to graduation rates, site leaders are likely to be considering less tangible impacts as well as actual graduation rates.

Biggest supports and barriers

Sites were asked “Broadly speaking, what steps most helped you to increase the number of graduates, and/or what barriers most prevented you from increasing the number?” The reported supports and barriers are cataloged below. Comments on these questions were often brief so the data is suggestive, not complete. Comments are again organized by the level of productivity of the site:

1. Less productive (N=4)
2. Productive during grant (N=3)
3. Productive during and after grant (N=2)

Items in italics were stated elsewhere in the interview so added manually by Chasteen.

<table>
<thead>
<tr>
<th>Stated SUPPORTS</th>
<th>Stated BARRIERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Professional brochures.</td>
<td>● Small number of majors (N=2)*.</td>
</tr>
<tr>
<td>● Giving students short-term teaching experiences.</td>
<td>● Lack of interest in teaching among majors.</td>
</tr>
<tr>
<td>● Strong collaboration with education.</td>
<td>● Poor perceptions of teacher salary and status among students</td>
</tr>
<tr>
<td>● Noyce funding</td>
<td></td>
</tr>
<tr>
<td>● New path to licensure</td>
<td></td>
</tr>
<tr>
<td>● Enthusiastic people working for teacher education at institution.</td>
<td>● Poor perceptions of the teaching profession by the public in the state.</td>
</tr>
</tbody>
</table>
- Using publicity from PhysTEC to brand the program.
- **Recruiting methods**

<table>
<thead>
<tr>
<th>Champion positions</th>
<th>Interview comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Senior lecturer</td>
<td>- Yes, single champion. But I’m not as vocal as I should be.</td>
</tr>
<tr>
<td>- Associate Professor</td>
<td>- Yes, 3 champions, and physics faculty are advocates for the program.</td>
</tr>
<tr>
<td>+ Professor</td>
<td>- Yes, single champion, plus another faculty member who acts as advisor.</td>
</tr>
</tbody>
</table>

*One of these institutions has objectively few majors/year (~9) but the other has ~20/year.*

Recruiting activities are seen as supports across many sites, regardless of productivity, as are streamlined licensing requirements. However, structural supports were common among the most productive sites (such as Education waiving prerequisites, or NSF funding). Thus, the most consistent barriers are small numbers of majors, and poor perceptions of the teaching profession, mostly among students. Additionally, lack of support from physics faculty was often a barrier. Notably, neither of the most productive sites mentioned poor perceptions of the teaching profession (though they did mention lack of enthusiasm among physics faculty).

**Champion**

Sites were asked whether they feel their program currently has a “champion,” defined as “the person who advocates for the program, and steps up when support is needed, to ensure program success.” Below I indicate the positions of the champions, and what the interviewees said about the status of their champion. Statements are not in order to preserve anonymity.

**Less productive programs:**

<table>
<thead>
<tr>
<th>Champion positions</th>
<th>Interview comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>- No time available; Program team has too many other responsibilities.</td>
<td></td>
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<tr>
<td>- Low local population density.</td>
<td></td>
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<tr>
<td>- Lack of support among physics faculty.</td>
<td></td>
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<tr>
<td>- Lack of support from Education.</td>
<td></td>
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<tr>
<td>- Few local teachers to partner with / for students to visit classrooms</td>
<td></td>
</tr>
</tbody>
</table>

| - Personally visiting classrooms to pitch the teaching profession. |
| - College of Education allows students to join Methods classes with no prerequisites |
| - Funding from another NSF grant to support tuition. |
| - **Streamlined requirements for degree** |

| - Lack of enthusiasm from physics faculty to visit their classrooms. |
| - Poor future job prospects for students, including potential work environment. |

**Productive during grant**
Champion positions | Interview comments
---|---
- Professor  
- Professor |  -  *Unclear response.* “We do have champions at collaborative institutions, and we are continuing to work with academic advisors in the physics department.”  
- Yes, but distracted by other professional interests, so my support has lagged.

### Productive during and after grant

<table>
<thead>
<tr>
<th>Champion positions</th>
<th>Interview comments</th>
</tr>
</thead>
</table>
| - Associate professor and former chair  
- Department chair and associate dean; later dean |  - Yes. Now Dean and time constrained.  
- A few people who care, but time constrained; respond when is critical. |

Thus, regardless of the level of productivity, all sites had a champion. The positional power of the champions varied, but the most productive sites did often have the chair as a champion.

### Enduring impacts

Sites were asked to reflect on the most significant durable impact of the PhysTEC grant. Below are the results of those responses, with less productive site responses in blue, productive during the grant in green, and productive during and after in orange. Statements are provided verbatim.

- It continued to strengthen the relationship between the Physics and Education departments and raised awareness in the Physics department faculty, particularly the newer faculty.
- As a faculty advisor for Physics majors, my experience w/ PhysTEC led me to be more active in trying to recruit majors into teaching. It directly led to [Institution] getting a Noyce grant (we received one which started in May 2019). Independent of the Noyce, my participation in PhysTEC also led me to obtain funding from our College for a “Physics Ambassador Program”, in which our majors go into high school classrooms for a couple of days over Spring Break. We successfully recruited three strong majors for this program for Spring Break 2020, but had to cancel because of the pandemic.
- A new (as of 2016) official major: “Physics and Education Interdisciplinary Major” which is a clear path to the [Institution] Teacher Scholar program and licensure.
- I think the most significant, durable impact is the methods set up for recruiting. Due to limited resources (population, increasing demand on faculty) having the methods set up
to recruit has allowed us to continue recruiting even though the funding is no longer available.

- Recognition at my institution that physics and mathematics is a more natural pairing than physics and other natural sciences for teacher certification.
- I like how we refined and streamlined the requirements for the Physics Education degree program. That’s lasting. We annually review the physics education program and make any necessary changes, and that is a benefit to the students and the program in general.
- The secondary ed. degree has been raised in profile and is no longer an afterthought.

Sites were asked to reflect on the outcomes and results reported in 2018, organized into categories which are aligned with the PTEPA Rubric (though they were not framed in this way). Below are the results of those responses, again color coded. Responses are summarized.

| Supportive culture or recognition (PTEPA 1A) | Yes, endured  
Yes, endured; a few faculty in department are more supportive.  
Yes, institution was always supportive.  
Yes, endured in education and in department. UTeach program supports this value.  
Endured some in department; 5 of 6 faculty participated in section AAPT.  
Yes, strong culture, I push it, department is receptive.  
Yes, teaching is higher profile than before PhysTEC, and chair is attuned. |
|---|---|
| Rewards or resources (PTEPA 1B, 1C) | Yes, endured  
There is lack of support or career-based awards, making it difficult to sustain effort.  
No change.  
No real impact; incentives are equivalent for all faculty; leader has tenure.  
None.  
Yes, have Noyce grant and professional development funds.  
Did not endure. |
| Program team (PTEPA 1A, 1B) | Yes, endured  
Small team (3 people): Champion, advisor, HS teacher  
Small team endured (3-4 faculty), in good communication.  
Physics champion actively recruits people.  
Persistence in spirit, but not active.  
Yes, have champions in physics (1) and 2 in education.  
Sort of endured. Have UTeach program and the advisor plays a role in informing students. |
| Collaboration (PTEPA 1C) | Yes, endured  
Collaborator retired but have been able to collaborate with successor.  
Yes, endured.  
Yes, endured. |
| Recruitment strategies (PTEPA 3B) | Yes, endured  
Yes, continue to emphasize teaching as a career for majors; however university may drop requirement for faculty advisors for majors which would impact this significantly.  
Yes, endured, but not strong (relies on brochures and occasional announcements in courses).  
Collaborative recruiting not maintained, but UTeach does recruiting.  
Early teaching experience (Supplemental Instructor program) generates some interest in teaching.  
Yes, visits to physics courses, outreach activities, and encourage students to take Methods course to test the waters.  
Yes, endured; strong guidance and information to students. |
| Pathways to licensure (PTEPA 3D) | No changes made.  
No changes made.  
Yes, endured; made a new major through grant and maintained.  
Transitioning from CAEP accreditation currently (unclear what other licensure requirements may have been maintained previously).  
No change; have tried to streamline but no success.  
Streamlined requirements. And post-bac students can use 12 credit hours towards master’s degree.  
Same as before: UTeach degree option. |
| Coursework (PTEPA 4B) | No changes made.  
No changes made.  
A new course which happened at the same time as grant (coincidence) has endured; makes program more visible.  
No changes made.  
No changes made.  
No changes made.  
No changes made; courses through UTeach program. |
| Community (PTEPA 5B) | No changes made.  
No changes made.  
Too few students for strong community, but good in department.  
Mentor in-service teachers; will be used for physics graduates if they happen.  
Little activity: Encourage student participation in AAPT.  
Too few students for strong community. Noyce does have chatroom for students.  
No enduring practices. |
| Program assessment | Yes, endured  
Yes, endured: Use an evaluator for Noyce. |
| (PTEPA 6) | • Has not maintained internally, but engage when PhysTEC asks for data.  
• Only CAEP accreditation (now transitioning away from).  
• Only through PhysTEC.  
• Minimal, except for CAEP. Annually review physics ed program.  
• Mainly into reviews of UTeach programs. |

Requests for PhysTEC

Below are the open-ended responses to a question about suggestions for PhysTEC:

- I wish PhysTEC would put together a short, professional, video about teaching physics and the rewards and stability that can come from becoming a Physics Teacher. I would be more likely to show a 5 minute video (if it is well done) than to make an announcement in my intro physics classes about the possibility of teaching physics as a career.
- Encourage physics teacher educators in the physics departments to learn about what their colleagues in education teach and how that is critical to the success of physics teachers. Physics can not do this alone; we need our education colleagues who are experts in the pedagogy, differentiated instruction, classroom management, assessment, etc.
- Keep doing the recruiting grants, if possible. I think they do have a long-term effect. I wish there was another way for the American Physical Society to push Universities to value faculty participation in programs like PhysTEC and other STEM teacher education programs.
- PhysTEC is a great organization, with great people offering all the help one might want when trying to build a successful physics teacher education program.
- I am thrilled to have an organization like PhysTEC championing this cause. I see the issue of physics teacher recruitment as having two main facets: finding talented physics students who have a potentially unnurtured interest in teaching, and helping those students navigate through a licensure program that does not necessarily reflect their specific needs. The first facet can be aggressively addressed at the local level. The second facet is more appropriately addressed at the state level, since that entity has the power to dictate licensing criteria.
- It was a valuable and successful endeavor. The resources and guidance provided have improved the program, even as the amount of effort diminished. We are very satisfied with the experience.
- I think the best use of resources is helping with the hiring of TIRs. Funding them long-term is the challenge. Finding means to support beginning physics teachers (monetarily for involvement with sustainable professional development?) while they start teaching would a means to potentially attract students to physics teaching.
Interpretation: What might lead to different levels of productivity?

In this section I look across the data reported to identify trends which might help us understand the different levels of productivity.

**Universally true**

The below findings applied to all sites, regardless of productivity:

- All felt that PhysTEC positively impacted physics teacher education at their institution.
- To a lesser degree, they also felt that PhysTEC is likely to lead to future improvements in physics teacher education at their institution.
- Recruiting activities were seen as a support to increasing the number of physics teachers, as were streamlined pathways to the degree.
- Poor perceptions of the teaching profession were a barrier at many sites.
- All indicated that their site currently had a champion.
- All were able to list durable impacts as a result of engaging with PhysTEC, regardless of graduation rates.
- Enhanced prestige and recognition for the physics teacher education program was an enduring impact for several sites (N=3), as were new degree pathways or streamlined licensing (N=2) and active recruitment (N=2).
- Sustainable elements included:
  - Supportive culture in the institution or department (N=7)
  - Program team (N=7, but varying degrees of activity)
  - Collaboration (N=6)
  - Recruitment activities (N=7, but to varying degrees of strength).
  - Pathways to licensure (among all 3 sites that made those changes).
- Less commonly maintained was program assessment, which was most typically only done in response to an external request (e.g. PhysTEC, CAEP).
- Few changes were made through PhysTEC to recognition, coursework or community-building.
**Less productive**

These sites were typified by annual graduation rates of 0 or 1 teacher post-funding, and during-funding gains that oscillated between 0 and 1 or 2 teachers. Note that these graduation results are based on the “funded plus one” period which includes the post-funding year 1 as a lagging indicator.

Less productive institutions were somewhat less likely to indicate that PhysTEC had impacted PTE at their institution, though this was not universally true (ratings were 60, 75, and 90 out of 100). They were also more likely to indicate that a small number of physics majors were a barrier to increasing the number of physics teachers. While all of these sites indicated that they had a champion, 2 of these 3 sites specifically indicated that they were solo champions. The stated main impacts of PhysTEC for these sites indicated capacity-building in the terms of collaboration with Education, a more active champion, future Noyce funding, and a licensure pathway; thus PhysTEC funding had positive impacts for these sites regardless of graduation rates. These sites continue to engage in recruitment activities and have a program team. Based on the stated barriers, engaging in program-building activities (to increase the number of majors) and using Get the Facts Out (to improve perceptions) could help these sites.
**Productive during grant**

Below are graduation rates for these sites [Redacted]. Both experienced some success during the grant period which dropped off immediately after.

These sites were mixed in their reports of whether PhysTEC had impacted PTE at their institution (ratings were 60 and 95 out of 100). They also named a variety of barriers such as lack of time, and lack of support and collaboration. While both seemed to have a champion, one indicated that they are distracted by other professional interests, and the other was not clear in their response. As with the less productive sites, these sites stated durable impacts (recruiting methods, institutional recognition) that indicate impacts of the grant regardless of the ultimate graduation rate. One was a UTeach site. Based on stated barriers, these sites could benefit from the use of Get the Facts Out, as well as assistance in building collaborative relationships across the institution: They might be ripe for the Fellows or other similar programs.

**Productive during and after grant**

Below are graduation rates for these two sites [Redacted], which are a markedly different pattern than the previous two sets; graduation rates increased from low pre-funding rates to 1-3 teachers during funding, and then maintained or continued to increase post-funding.

These more productive sites were more likely to indicate that PhysTEC had had significant impacts on physics teacher education at their institution. They were less likely than other sites to name a small number of majors, or a poor perception of teaching as a profession, among the barriers that they had experienced to increasing their majors. The types of supports that they named were also more likely to be structural (e.g. agreements with Education for students to take the Methods course, NSF funding) than the other sites. These structural supports are also more likely to be sustainable and to remove systemic barriers to pursuing teaching as a profession.

More productive sites, somewhat counterintuitively, did not indicate that they had a more engaged champion. One, however, was a Dean, suggesting positional power (though little time). One was a UTeach site. Sustainable practices from the PTEPA were mixed for these two sites and seemed to reflect the status of one site as UTeach: The non-UTeach site stated many strong relationships, professional rewards, and enduring program assessment. The UTeach site, on the other hand, looked less strong on these PTEPA categories, relying on the UTeach degree option, coursework, and annual reviews. However, the UTeach site did actively recruit students to the program, which (coupled with the UTeach structure) may account for their success.

I also reviewed the 2018 interview results to seek further information about what might have been background influences for these two sites. Both sites had relatively high “support for teaching” on the Survey for Climate of Instructional Improvements (SCII) -- though so did one of the less productive sites. Both had fairly concrete and well-defined early teaching activities as the focus of the grant: Recruiting students to be paid planetarium presenters and encouraging
them to take Methods course, and giving students stipends to engage in Step 1 courses. Both sites maintained those activities. In comparison, other institutions created a teacher training workshop, engaged in generalized recruiting activities or materials, or funded LA or SI programs. Note that while several sites used a TIR (often part-time) the influence of the TIR was very mixed and none were sustained.

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Thus, the more productive sites are mostly typified by having adequate majors, a good perception of teaching as a profession, and structural supports. These suggest that encouraging sites to use Get the Facts Out, to simultaneously work to increase the number of majors in their program, to seek concrete agreements with Education, and to seek future funding (Noyce, UTeach) would be beneficial. They are also typified by concrete, well-defined activities aimed to introduce students to teaching (rather than a range of broader recruiting or visibility activities).
Appendix: Written interview protocol

This was provided to sites in a Google Doc.

**Institution:**

This written interview can be completed by one or more members of the site team, together or sequentially. It would be very helpful to have more than one member complete it. The most efficient may be to have one member complete it and then the other add to that response for additional perspective.

Only one form should be submitted per institution.

I estimate that this should take about 10 minutes of time, and will be very valuable to PhysTEC in understanding the outcomes of this grant strand, which were honestly quite mixed.

Each individual participating should complete the consent form.

- Please **download the consent form here**. (Do NOT complete the form online as this link has been shared with others).
- Email the completed form to stephanie.chasteen@icloud.com. You may insert a digital signature, or sign it and take a photo, whatever is easiest for you.

The interview starts on the next page.
In the evaluation study which was completed in 2018, we found the following messages from site leaders of Recruiting Grants:

- Sites had positive outcomes, with some structures maintained (e.g. recruiting resources, awareness of PTE, degree tracks)
- Funding enabled site leaders to prioritize teacher education but this momentum can fade.
- Site leaders needed more guidance on using and maintaining teacher partners (TIRs, TAGs).
- Site leaders gained knowledge at the conference and from other sites, and would like more opportunities.
- Many sites currently lack a positive ambassador for the teaching profession.
- Common challenges were the perceptions of teaching, small numbers of physics teacher candidates, and rural locations.
- Many sites lost a reason to engage with the School or College of Education once the grant ended.

The purpose of this written interview is to understand how any changes to your program were or were not sustained since the PhysTEC grant ended. As a reminder, the period of the PhysTEC Recruiting Grant was September 2016-May 2017. When you are asked to consider the “physics teacher education program” or the “program leaders,” please consider whatever program or degree track which serves to prepare future physics teachers, and the faculty or administrators who spearhead that program.

All areas in **blue** are places for you to indicate a response.

**Names of people completing this form:**

1. Your response
2. Your response
3. Your response

We encourage you to complete this form collaboratively (which can include asking others to review and add to your responses).

Below is a graph of teacher graduation rates from all Recruiting sites over time, compared to your site. The two years in orange (2014 and 2015) are the Funded Years. If there is a white/open dot, that indicates we do not have program data for that year. **Note on the actual protocol this graph was replaced with that for the relevant institution.**
1. In examining the number of physics teachers your institution has graduated over time, how well did you meet the goal of the Recruiting Grant to increase the number of qualified physics teachers?

Your response here

2. Broadly speaking, what steps most helped you to increase the number of graduates, and/or what most barriers most prevented you from increasing the number?

Your response here

3. A physics teacher education program leader (or “champion”) for the physics teacher education program is the person who advocates for the program, and steps up when support is needed, to ensure program success. Do you feel your program currently has a champion?

Your response here

We interviewed you in 2016 and 2018 to identify the outcomes of the grant. As a reminder, you indicated that the primary activities that were funded by PhysTEC were as follows:

- Note on the actual protocol this area listed some specifics of that institution’s interview.

Also as a reminder, in 2018, you indicated the status of some of these activities and impacts as follows:

- Note on the actual protocol this area listed some specifics of that institution’s interview.

1. Reflecting on these outcomes and results (and any others not mentioned above) which of those changes have endured in each of these areas?

   - Supportive culture or recognition in the university, college, and/or department for physics teacher education.
     - Your answer
   - Rewards and resources for physics teacher education (including credit for tenure, internal or external funding, or staff).
     - Your answer
   - Program team (including leader/champion, other faculty, and/or TIRs), and their expertise in and commitment to physics teacher education.
     - Your answer
   - Collaboration between physics and education partners and/or units.
2. Reflecting broadly on your experience as a PhysTEC Recruiting Grant, what is the most significant, durable impact that you think came out of the work? This may be something you mentioned above, or something else.

Your response here

3. Looking across time, please rate the extent to which the following are true. Please use a scale of 0 to 100, where “0” is “not at all” and “100” is “completely.”
   1. Engaging in PhysTEC impacted physics teacher education at your institution. Your rating: ____
   2. Engaging in PhysTEC is likely to lead to future improvements in physics teacher education at your institution. Your rating: ____

4. Do you have any comments on your experience improving physics teacher education, or suggestions for PhysTEC?

Your response here

Thank you! Please email stephanie.Chasteen@icloud.com to let me know you have completed this form, or simply add a comment which includes my email address and I will get notified.