EXECUTIVE SUMMARY
2021 Comprehensive II Site Sustainability Evaluation Study

Stephanie Chasteen (External Evaluator)
With quantitative data visualization help from Alexandra Lau
September 3, 2021

The full report includes detailed summaries, findings and evidence and is available at phystec.org.
Executive Summary

This study focused on the sustainability of 16 PhysTEC Comprehensive Grants funded from 2010-2015 ("Comprehensive II sites"). Evaluation questions included whether the number of physics teacher graduates increased, and sustained, what PhysTEC activities were sustained, and what factors contributed to sustainability. This period spans 5 different requests for proposals. Funding amounts were typically $300,000 over 3 years, plus a recommended 3-year institutional match; UTeach replication sites were funded at a lower level. Data gathered included archival documents, graduation data, a written survey, and a series of interviews, including completion of the Physics Teacher Education Program Analysis (PTEPA) Rubric. The desired outcomes included:

- Institutional capacity and culture for physics teacher education (PTE), such as leadership, resources, structure, and policy, and
- Sustained PTE program outcomes, such as graduation and an effective PTE program.

Sites were rated as “unsustained,” “mixed,” “sustained,” or “grew.”

The full report includes a diverse and rich data on outcomes across institutions, as does the full report summary. This executive summary provides only a very brief overview of the study.

**Comprehensive II legacy sites often sustain their outcomes** -- all but two sustained their outcomes to some degree, with meaningful outcomes and lasting impacts of the grant. All have a functional PTE program. More than half (9 institutions) are rated with high sustainability.

**Comprehensive II legacy sites grow and sustain their graduation rates on average.**

Teacher graduation increased by 1/year on average and this increase was sustained on average (1.3 teachers/year pre-funding, 2.2 teachers/year during-funding, 2.4 teachers/year during the sustainability period). For those sites which experienced an overall gain in graduation rate (N=11 sites) the average increase is 2 teachers/year. Gains and graduation rates were also overall higher for sites rated as sustained. Future teachers represented about 10% of undergraduate majors, on average, and about half of future teachers were certified through post-baccalaureate pathways.

![Graduation rates by sustainability level](image-url)
PhysTEC supported strong culture, norms, and capacity for PTE and created strong PTE programs. In many cases, the most important outcome was stated as being the supportive culture for teacher education. Site leaders were overall proud of the results of the grants, and the quality of education provided for teacher graduates. Based on the PTEPA Rubric, PhysTEC supported many improvements in PTE programs, such that Comprehensive II sites rival the strength of thriving programs in terms of program structure and practices. LA programs, curricular changes, and recruitment practices were commonly mentioned durable outcomes, and institutionalization of LA programs was somewhat common. Students at former PhysTEC sites also receive quality preparation regardless of site sustainability: All sites including “unsustained” sites) were found to have strong ratings in the PTEPA “Knowledge and Skills” standard -- this standard includes physics content and pedagogy, and field experiences. Additionally, nearly all sites experienced growth in PTEPA ratings during PhysTEC funding, regardless of sustainability level, showing that Comprehensive grant funding improved PTE programs.

Successes promote a positive feedback loop and provide “proof of concept.” Often, success bred success; the PhysTEC grant enabled site leaders to establish “proof of concept” that PTE was viable: That there was interest among students, there is demand for courses, graduation numbers could increase, and Teachers in Residence (TIRs) and Learning Assistant (LA) programs could be valuable for the department. LA programs supported a strong culture for teacher education, which then supported the LA program. The institutional match period often helped establish the value of these program elements and create funding and routine to support them.
Most activities were maintained for most sites, especially LA programs. Overall, it is remarkable how many activities and structures were maintained across sites. Sustainability plans from the grant were upheld and in all but two cases the institutional match commitment was upheld. For most areas of the PTEPA Rubric, activity maintained or increased since PhysTEC for at least 80% of sites. LA programs were maintained at 13 out of 15 sites with an LA program; PhysTEC created or helped to maintain all these programs. External funding and human resources (e.g., full time equivalent, number in the team, TIR) were often reduced. The TIR position was maintained for over half of institutions (N=9), usually in a regular departmental position (such as lecturer or lab coordinator). About half of current TIRs were part-time. Most TIRs who were sustained included coordinating an LA program as part of their duties, demonstrating that LA programs can be an effective part of a sustainability plan, even if only indirectly related to PTE.

Human and financial resources are related to sustainability. Unsustained sites lacked champions, resources, and capacity for PTE. The two unsustained sites did not have a champion, and there were also very few resources allocated to PTE (e.g., funding, people, and FTE). Sites with greater levels of sustainability had generally higher levels of internal and external funding, greater numbers of PTE leaders and team members, and greater FTE spent by faculty. Local teacher salaries were not related to sustainability level, nor was the year of funding. UTeach replication sites experienced mixed sustainability results, with the Master Teacher not typically serving as a good replacement for a PhysTEC TIR.

Sustainability increased with the number of majors and with postbac pathways. Department size was higher for the 9 more well-sustained sites (average 33 majors/year) compared to the less sustained sites (average 21 majors/year), and these sites also grew more (+15-16 majors/year on average compared to +8 majors/year). The percentage of majors choosing to become teachers also increased with the sustainability level (8-9% for lower sustainability compared to 10-11% for well-sustained sites). Well-sustained sites tended to include a post-baccalaureate pathway as one of the main ways in which students achieved certification, and more students graduated through these pathways than through undergraduate-only routes.

Site capacity is necessary but not sufficient for sustained outcomes; the addition of institutional culture is a hallmark of the exemplary institutions. Each site was rated on their capacity and culture for PTE based on their leadership, institutional culture, and resources. All those rated as sustained were at least “medium” capacity. Thus, “medium capacity” may be a threshold for good results. Among the 9 sites that were rated as sustained, 4 were identified as truly exemplary; these were marked by stronger institutional climate and program collaboration and rated as “high capacity.” Sites that were sustained but not exemplary appear to have maintained their programs and outcomes as a result of the efforts of champions, rather than due to broader commitment to the cause. Thus, “high capacity” including a strong institutional climate may be needed for exemplary results. Five sites had strong capacity and strong PTE programs, but low graduation rates; these were denoted as “mixed.” Mixed sites (5 institutions)
had generally good PTE programs but reduced graduation rates. These sites were typified by engaged champions but lacked supportive structure and institutional culture. When asked what helps keep things going at the site, we found that drivers of sustainability include people, money, structure, culture, and routine: The effort of champions, money, formalized structures, and culture change are critical. In many cases, having enough time to establish programmatic success enabled the establishment of value, and routines, to support continuity.

I thus conclude that:

- PhysTEC Comprehensive Sites achieve meaningful results for institutions, and the nation.
- PhysTEC supports organizational capital and a healthy ecosystem for PTE at institutions.
- It is difficult to maintain leadership, time, and effort, leading to fragility.
- Culture, including structure and routine, can help with sustainability.
- Motivated people, site capacity, and institutional culture are important, but insufficient on their own. Exemplary results require all elements of the model below to be exemplary: Motivated people, structure, and culture, likely with good connection to structures which support undergraduate education broadly.