What Does It Take to

Put Comprehensive High Schools on the Road to Transformative Change?

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The STEM Early College Expansion Partnership (SECEP) has been working in five districts in Michigan and Connecticut, helping them to implement the Early College model in local high schools while also strengthening STEM education. Over five years, SECEP sought to improve college readiness and STEM education experiences for 22,000 high need middle and high school students, decreasing drop-out rates and boosting college enrollment. The project's aim was to improve underrepresented populations' access to STEM careers by increasing the number of students enrolling in dual credit STEM courses and pursuing postsecondary credentials.

The project is led by the National Center for Restructuring Education, Schools and Teaching (NCREST) at Teachers College, Columbia University, in partnership with Jobs for the Future (JFF), the Middle College National Consortium (MCNC), and school districts and colleges in Connecticut and Michigan. We are achieving our goals by providing professional development and coaching that encourages school and their college partners to implement early college design principles as well as to improve STEM instruction.

Introduction

For varied reasons, comprehensive high schools often resist engaging in the type of transformative change that affects the core of their work.[1] Schools participating in the STEM Early College Expansion Project (SECEP) have made such changes, creating a more college-going culture, increasing the number of students receiving college credits while in high school and changing their instructional practices.[2] This brief uses information from the external evaluation of SECEP to describe the different implementation supports that were necessary for making changes like these. Although the supports were specific to the project, we consider SECEP as a case study illuminating lessons learned that are applicable across a multitude of interventions.

We start with a brief overview of the SECEP project and its rationale. We then place the supports used in this program in the context of key literature on implementation and describe lessons learned relative to these supports. The findings are based on data collected as part of the evaluation including survey and site visit data and a series of reflective interviews with project staff and school and district leaders about their perceptions of the most effective implementation strategies.

The SECEP Model

The STEM Early College Expansion Project (SECEP) was a federally-funded effort to combine aspects of the proven Early College model with the creation of STEM-focused pathways and instructional strategies, implementing them all in comprehensive high schools.[3] SECEP's goal was to "improve STEM education for 22,000 high need middle and high school students, decreasing drop-out rates and boosting college enrollment." They also sought to "further improve underrepresented populations' access to STEM careers by increasing the number of students enrolling in dual credit STEM courses and pursuing postsecondary credentials" (SECEP Year 2 Management Plan). Additionally, the project aimed to increase students' interest in STEM subjects and careers by engaging students in STEM projects and problem- or project-based learning.

To accomplish these goals, SECEP supported the implementation of a STEM-focused Early College model in comprehensive high schools (see Box for the STEM Early College Design Principles). The program was implemented in two settings: four Intermediate School Districts or ISDs in Michigan and a large urban district in Connecticut.[4]

STEM Early College Design Principles

STEM College-focused Academic Program, which emphasized early access to college courses, STEM pathways, student-centered and inquiry-based instructional strategies

Wraparound Student Supports, including academic and social supports and support for college knowledge

High school-College Partnership, a strong partnership with shared resources and regular communication

Culture of Continuous Improvement, including regular use of data and ongoing professional development and collaboration

SECEP was a partnership between three intermediary organizations, each with a long history of Early College work. The overall effort was led by the National Center for Restructuring Education, Schools and Teaching (NCREST) at Teachers College, Columbia University, collaborating with Jobs for the Future (JFF) and the Middle College National Consortium (MCNC). JFF was responsible for project implementation in Connecticut while MCNC was responsible for project implementation in Michigan.

These organizations, plus the districts with which they worked, provided a suite of services (or implementation supports) that were intended to support each participating school's implementation of the STEM Early College Model. This brief describes the implementation supports

that were seen as most useful in facilitating implementation of the SECEP model, emphasizing the implications of these experiences for other projects. We begin by briefly discussing what the research says about effective implementation and then use this research to structure the remainder of the brief.

Conceptualizing Implementation

Implementation can be defined as a "specified set of activities designed to put into practice an activity or program of known dimensions."[5] To help schools implement the STEM Early College Model, the intermediary organizations, which included Teachers College, MCNC, JFF, and the districts (who played a dual role as implementers of the intervention and provider of supports for the schools in this project), provided a key set of services. These services could be considered implementation supports, which are the focus of study of a field entitled "implementation science." According to the National Implementation Research Network,[6] "Implementation Science is the study of factors that influence the full and effective use of innovations in practice...", and it focuses specifically on the processes and activities that help practitioners implement interventions.

Researchers on implementation science have identified a series of stages for the implementation process.[7] This brief is organized by those stages: 1) selecting and preparing partners; 2) creating a structure for implementation such as a plan and management team; 3) ongoing support once implementation begins; and 4) sustaining the work. In the next sections, we briefly describe each stage and then use SECEP as a case study to surface issues and lessons learned about these different stages.

Stage 1:
Selecting and preparing partners

Successful implementation depends on laying the groundwork. Activities that are recommended in the literature include selecting sites and partners by assessing their needs and readiness for implementation, examining the policy context, and determining the fit between the intervention and the community.[8] Reviews of the implementation literature indicate that, during this phase, project developers should also ensure that the core aspects of the intervention are clearly defined and delineate an acceptable level of adaptation.[9] Finally, this first phase of implementation involves ensuring that there is commitment and buy-in to the initiative from participants.[10]

In SECEP, two aspects of this stage were particularly salient:

1. Selecting appropriate partner districts and

2. Ensuring clarity around the intervention.

Each is discussed in more depth below.

Selecting Appropriate Partner Districts

Reflecting on implementation, project staff were asked to identify the characteristics of district partners that were essential for successful implementation. The first two characteristics—1) a level of initial commitment and buy-in from district leaders and 2) alignment of the intervention's goals with the mission of the district—are characteristics that would be critical for any program. The third characteristic—3) the existence of a strong and willing college partner—is particularly important for the early college model, given its emphasis on dual enrollment.

According to the literature, a level of initial commitment or buy-in is a

critical component in the success of any initiative.[11] This conclusion was also reached by SECEP project and district staff, who all noted that there needed to be support for the project at the top levels of each participating institution from the beginning of the project. As a project staff member noted, "There has to be at least one person in a higher position, who is going to say this project is worth our time…If there's no champion there, it's really hard to get the stuff done." A district representative agreed, "If you don't have complete commitment from an administrator, this is gonna fall apart big time."

This commitment also depended on a clear understanding of the project and an understanding of what the district was signing on to. For example, a district staff member recommended that:

❝ If a school district signs onto the grant, their principal and superintendent almost would sign an assurance page, so they can acknowledge that yes, I understand what this grant's about. I understand what we're going to do, and here's what I'm gonna do to support this project forward.

Project staff from intermediary organizations also noted that stronger district partners were ones where the project's goals were well aligned with the current vision of where the district wanted to go and where the district would be able to integrate SECEP into their strategic plan. As a project staff member described,

❝ A district that has a Christmas tree range of programs, where you have a thousand different programs, they're not people who make commitments. And if they have programs in place that have an opposite value system from the underlying value [of the project], they're probably not a good bet… Like for this project, districts that already have shown evidence of interest in STEM or in dual [enrollment] relationships with colleges, those districts are probably a better bet.

If many different initiatives were in place in a district, these could be barriers to implementation given that this leads to increased competition for leaders' and teachers' commitment, time and resources.

For projects that emphasize dual enrollment as does SECEP, successful implementation required identifying districts that had access to strong postsecondary partnerships. Both project and district staff noted that the postsecondary partner had to demonstrate its own commitment to the goals of the

project and had to believe that dual enrollment was worthwhile. One project staff member noted that a district needed to have access to "one strong community college anchoring partner, who, and then the caveat is this, who can figure out a sustainable financing model, or who are committed to finding a sustainable financing model for dual credit." The importance of having a postsecondary partner who was willing to work with the funding was not to be underestimated, given that there were challenges across both states in obtaining funding for college-level courses. A district staff member further described this issue:

" The district level people would have to look and see, who's the most realistic postsecondary partner? Do they realize the financial burden? Are they willing to compromise or put together a financial structure that entices and promotes partnerships?

One potential best practice relative to partner selection occurred in Michigan where MCNC and Michigan's local early college support network, the Michigan Early Middle College Association, used an application process to identify appropriate districts for inclusion. The group's leaders had long experience with Michigan's Early College work and were

able to review applications and evaluate whether the schools would be a good fit for the project. According to Michigan project staff, SECEP project leaders knew that the districts that were invited to participate in the SECEP project would be viable partners because they "were really interested or had already started exploring trying to create an enhanced dual enrollment system within their comprehensive 9th through 12th grade." The selection process was not perfect as two schools and one district dropped out of the project within the first year; however, the majority of districts exhibited commitment to the project and made substantial changes.

These findings suggest that partner selection is an important aspect of project implementation, particularly ensuring that there is commitment to the underlying goals of the intervention and initial support from key personnel.

Ensuring Clarity of the Intervention

As part of the partner selection and preparation process, the literature notes that it is important that all develop a common and clear understanding of an initiative's goals and components.[12] All of the district interviewees indicated that it was important to have a clear

understanding of the initiative from the beginning. In particular, participants noted that it would have been useful to conduct visits to schools that were already implementing the practices so that they could get a better image of what it looks like in practice.

In the SECEP project, there was a bit of a tension between the districts' desire for clarity about the intervention and the desire of project staff to engage the districts in co-creating the intervention, such as identifying their goals for STEM instruction and the professional development that would be most supportive of these goals. The project staff saw this co-creation as critical to sustaining the project and argued that it would be a more effective strategy in the long run, even if the price was less clarity at the beginning.

This tension might exist in many projects where there is an effort to adapt the intervention to the context. One possible way of balancing the two approaches would be to provide specific resources or alternative ways of implementing the model's core components and then ask schools to choose or adapt the approaches that would work best in their individual settings. For example, one district representative suggested that it would be useful to have a rubric or map that provided "guiding principles for success" but still allowed for participants to "have the flexibility to take it to their hometown personality and faculty that they have."

Stage 2:
Creating a Structure for Implementation

In this phase, the implementing organizations create a strategic plan to guide the implementation work and establish a team to implement this plan.[13]

All district staff agreed that it was critical to create a district-level team that could manage the project and also serve as an accountability mechanism. Each district had a specific project coordinator who worked with the SECEP team, which included district and, sometimes school, representatives who served in roles relevant to implementation. For example, in Connecticut, the team included the Executive Director for Secondary Education, curriculum coordinators for math and literacy, and district coaches, with principals attending some meetings.

The SECEP teams were responsible for developing and implementing a strategic plan that laid out their objectives and the strategies used to reach those objectives. The intermediary project staff provided external support in developing these plans (see description of technical assistance in Stage 3) but there was agreement that districts were more committed to the plans if they took the primary role in developing them. The plan also provided an

opportunity to help align the SECEP work with other work going on at the district. As one district leader noted,

> " I think like anything else, it's the... number of [initiatives] that are going on in the district, in the system, in the school, [we need to] help support and organize those, so it isn't a burden on principals and teachers. Integrating it into kind of the life of the school and the district so it doesn't look like another thing, a program, a separate thing that, if we just wait, it's going to go away.

With a plan in place, the team meetings served as opportunities for people to receive grant updates, share what was happening in their schools, and hold each other accountable for progress. Across all districts, interviewees agreed that using a team approach to implementation was a highly effective strategy. As one district staff member noted,

> " I think just the monthly meetings have been super helpful,...we just had a good leadership team that was aware of when deadlines were and aware of

what things had to happen and aware of the annual plan, and then was really using those meetings and that time to push everyone forward and to inform us all and to get different people in charge of different things to really run with it.

A project staff member highlighted how the teams also allowed for professional growth and distribution of responsibility, "The development of the teams has been crucial because that's building support capacity. That's what's building their

capacity, that it isn't on one person's shoulders."

At this stage of implementation, the literature suggests that implementation teams also need to identify or hire staff who will be implementing the initiative's activities, as well as staff who will be supporting those implementing the innovation.[14] Most of the staff implementing SECEP had to be identified rather than newly hired: teachers, who would adopt new instructional strategies; counselors, who would support expanded

groups of students in preparation for and access to college level courses; and principals who would implement all needed changes in their schools. The primary need was ensuring that these individuals were supportive of the project and that they received the capacity-building support they needed (as discussed in the next section).

However, some additional personnel were hired to work on specific aspects of the project, and that sometimes presented a challenge. Some schools needed to certify high school instructors to teach college level courses due to logistical difficulties getting students to the college campus and encountered difficulties finding qualified candidates. As noted by one leader,

> " I'm anxious about being able to meet [the college credit] outcomes of the grant. [...] Part of the reason is because there is a part of this that I can't control and that's our proximity to a partner. And I think that the other thing that I can't control is the number of staff... to do direct credit [dual enrollment] offerings.

Some districts also hired internal instructional coaches to support instructional changes. District and school staff reflected that selection of such coaches has to be intentional and purposeful. Districts found that coaches were most successful when they were perceived as strong instructional leaders. These more successful coaches were selected for their expertise and strong prior relationships with teachers. In other districts, coaches were not perceived as strong and respected instructional leaders and they had to be replaced midway through the project; these weaker coaches were seen as lacking expertise in math and science instruction and did not have the respect of other teachers.

The SECEP experience in this stage of implementation highlights the importance of setting up a team composed of individuals with responsibilities for different portions of the grant. Having a team approach increases the likelihood that progress will be made, especially when there are regular meetings to discuss completion of tasks and solve problems. In SECEP, these teams existed throughout the project and served to support ongoing implementation, which is described in the next section.

Stage 3:
Ongoing Implementation Support

This third stage is when actual implementation begins. During this phase, on-the-ground implementation support includes provision of the technical assistance and professional development necessary to implement the intervention. New information learned through professional development can be seen as "fragile" and needing support to implement within the specific school context[15]. Follow-up coaching has been shown to greatly expand the impact of professional development.[16] Also occurring in this implementation stage should be ongoing evaluations of the process and "supportive feedback mechanisms."[17] Fixsen et al. recommend that program staff

collect data about whether the program is being implemented as intended ("fidelity of implementation" data) and use them to guide decision-making.

The intermediary organizations—NCREST, JFF, and MCNC—provided a range of capacity-building activities, including technical assistance to district staff, professional development and coaching, that supported implementation of the SECEP model.

Technical Assistance to District Staff

To build district-level capacity to implement the work, representatives from the project staff (NCREST, JFF, MCNC and MEMCA) provided leadership coaching and technical assistance to the districts. Leadership coaching and technical assistance to the districts included a range of supports: monthly meetings with the project leads, assistance with developing a strategic plan, individual coaching for district staff, reviewing data, problem solving, monitoring implementation, developing annual plans and developing professional development workshops for teachers and principals.

Project staff also supported collaboration between the districts and their college partners; more specifically, the development of K-12-through-postsecondary academic plans, curricula, course sequences, scope and sequences, and STEM pathways.

It is important to note that this technical assistance started early in the process and overlapped with the team development and strategic planning work that occurred in Stage 2. The partners also maintained this technical assistance throughout the life of the project.

Professional Development

Professional development activities, such as conferences and workshops, was one of the core ways in which the project built the capacity of district and school staff to implement the STEM Early College model. District and school staff attended national and state-level conferences that developed staff expertise and also gave the opportunity to network with other schools and districts. In addition to the project-wide professional development, each district worked with project staff to identify professional development activities that were best aligned with the areas where they needed to grow. Areas targeted for professional development

included (among others): the Common Instructional Framework; helping teachers implement a growth mindset; project and problem-based learning; science modeling; and integration of technology into science instruction.[18]

The majority of individuals interviewed reported that the SECEP professional development was a key approach for improving teacher instruction that helped move teacher thinking. As one teacher noted,

> " I think the professional development was huge for our teachers, just some of our teachers really needed that push to go in the STEM direction or the project-based learning or the

> college expectation. We really needed teachers to buy into that. I think that without the professional development, that wouldn't have happened.

A district representative believed that the more clearly aligned the professional development was to the specific needs of the district, the more effective it was.

SECEP Coaching

In addition to the professional development, the project supported SECEP coaching services directly to the schools. Coaching that follows up on professional development is important to the success of program implementation.[19] Intended to provide support around implementation of the SECEP model, SECEP coaching was structured very differently in the two states.

In Connecticut, JFF provided external leadership coaches and instructional coaches who worked with schools directly as well as with local district and school-based coaches. The JFF leadership coach worked with principals and their leadership teams in schools while the instructional coach worked with district staff, including district-based instructional coaches, and teachers, providing professional development and support for the implementation of the Common

Instructional Framework strategies. There were also faculty from Teachers College who provided STEM-focused workshops and direct coaching.

In Michigan, districts used a mix of training, leadership and instructional coaching to support school staff. Intermediary organizations provided leadership coaching and technical assistance to ISD and district leaders. The ISD provided staff members who coached teachers at the school, facilitated SECEP school team meetings, and offered additional resources. While the ISD coaches were willing to work with teachers one-on-one, they primarily worked with professional learning communities, departments, and other small groups. A principal indicated that this may be a good thing because staff may not be ready for individual assistance, but they embraced the support provided in a group setting.

A project staff member believed that the coaches were helping move the project forward. She noted that district staff had told her,

> It moved them so much faster, because they had an outside coach coming in. And they could say, "We've got to get together because this coach is coming in to hear the progress we've made.

" We've got to move on [this]." It's just knowledge that they did not have, both in pedagogy, in STEM content, and in successful Early College experiences while students are still in high school. They really perceived that the coaches brought a level of expertise that many districts, especially smaller districts, they do not have STEM people with those life experiences.

The two approaches to coaching—

1. Having primarily external coaches coming from intermediary organizations and

2. Working primarily with internal coaches who come from the district or the school—

were each seen as having their advantages and disadvantages. External coaches, provided by intermediary organizations, were likely to be more knowledgeable about the intervention, but were also unable to be sustained when the grant ended. Internal coaches were more likely to be sustained and, because they were part of the district, may have helped to increase buy-in, but they also may have not known the SECEP model or the desired instructional practices as well, especially at the beginning. Our evaluation did not collect data on which approach was more effective but balancing these tensions is

something that project staff acknowledged. Providing both types of coaching (external and internal) with the ultimate goal of transitioning the knowledge and expertise from the external coaches to the internal instructional coaches was also seen as a way of sustaining the work.

Monitoring and Accountability

Having systems in place to monitor progress and make adjustments as needed is an important part of effective implementation.[20] As noted above, the coaches (both the external project coaches and the internal district coaches) played an accountability role as they came to check in on the progress being made. The SECEP teams also served in an accountability role. In both Michigan and Connecticut, school and district leaders shared their progress at the weekly or monthly SECEP Meetings. Some districts reported using a Self-Assessment rubric for the implementation of the design principles as a useful tool for internally monitoring schools' progress on the project goals.

NCREST staff played a different sort of monitoring and support role by collecting and analyzing formative outcome data on each of the participating districts. They administered student surveys and

collected data on college coursetaking. They then shared these data, as well as data from surveys administered by the external evaluator, in data use workshops. Numerous interviewees stated that these data workshops were beneficial and that they regularly used the data from the surveys.

While capacity-building and ongoing support are critical, it is important to note that there can often be turnover among the staff who have been trained.

Districts identified teacher and leader turnover as one of the biggest barriers to implementation. Those districts with high staff turnover also had a slower implementation pace due to the necessity to train and re-train staff and get commitment to the initiative from the new staff. Staff turnover is also likely to affect the sustainability of those changes that have been achieved by the end of the project and the resources necessary to sustain these changes.

Stage 4:
Sustaining the work

The ultimate goal of any implementation process is achieving the sustainability and institutionalization of the intervention model in the adopting organizations. The key characteristics of program sustainability are: 1) the routinization of program components and their integration as part of normal school or district business; and 2) a shift in ownership of knowledge and authority of the program from the intermediary organizations to the adopting sites.[21]

One key lesson learned from this project, as well as similar efforts, has been the importance of planning for sustainability from the beginning. As one SECEP project leader stated, "We have to start off...knowing that we're leaving. So, every grant now that I work on, we start off talking about sustainability and developing systems. So, when we leave, what can you sustain?" The implementation supports, such as the SECEP teams, technical assistance to districts, workshops and conferences, and instructional coaching were meant to build the capacity of those involved and to allow the districts to continue supporting the STEM Early College model.

Sustainability depends on having a set of key factors in place such as:

1. Organizational structures and systems to support the program goals;
2. Resources such as funding, time, and personnel;
3. Stakeholder buy-in, skills and expertise; and
4. An organizational culture shift to align with the program goals and create a new way of conducting business.[22]

Each is described in more depth on the next page.

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>
> – SECEP Project Leader
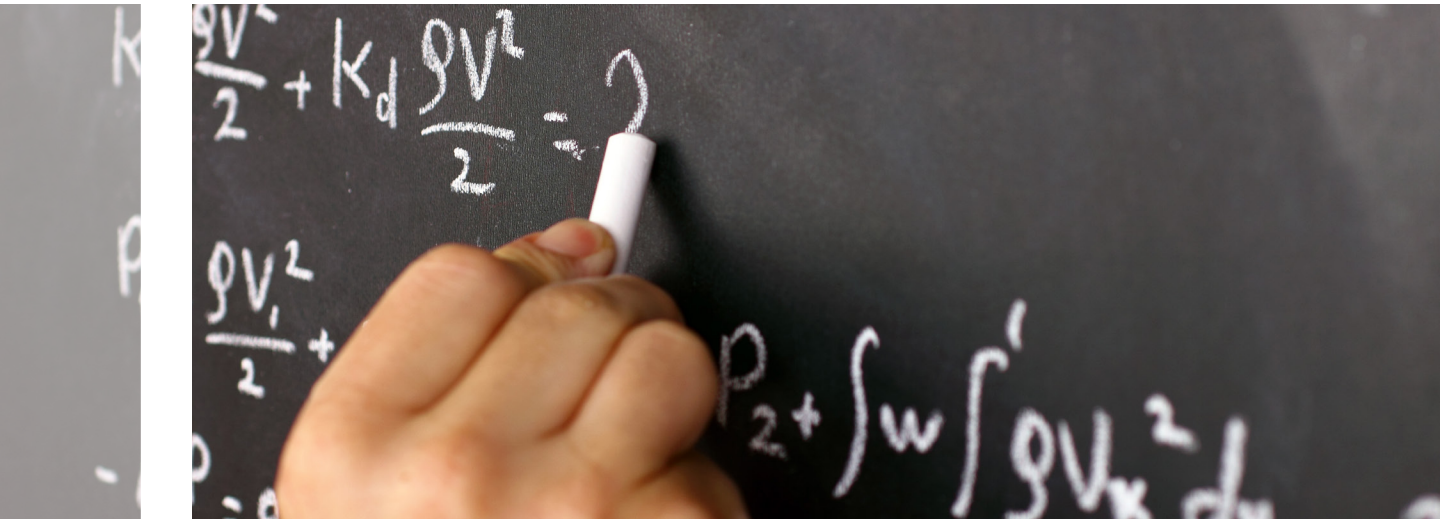
Organizational structures and systems

All of the project and district staff we interviewed described the structures that have been built during the SECEP program as foundations for sustainability. These structures included the postsecondary partnerships, course pathways (or structured sequences of high school and college courses), the SECEP teams, and an online Community of Practice that housed resources developed through the grant. One interviewee noted, "I think that's the key to the sustainability, that if there are structures in place and relationships in place."

Having teams in place was seen as a strategy to help sustain the work by minimizing the impact of staff turnover, which could have a negative impact on sustainability. As one project staff member noted, it was critical to "build redundancies in vision and goals and capacities at multiple layers of leadership, including ideally down at the school level."

Stakeholder buy-in

Belief in and commitment to the goals of the project are important not just at the beginning (as described earlier) but throughout the project and as the project's work is sustained. When asked about sustainability, participants in this project referred to the district and school leadership's commitment to sustain the initiative's activities as the strongest determinant of the initiative's future. However, they also noted challenges from turnover in leadership, which had also impacted implementation in some settings.

The Connecticut district and one district in Michigan, in particular, had turnover at all levels from the superintendent to the principals, which caused problems in implementation and was also seen as affecting sustainability.

Similarly, multiple teachers and leaders noted that the sustainability of the new instructional strategies depends substantially on teachers' buy-in into these strategies and their commitment to their continued implementation. Respondents reported that buy-in of both teachers and leaders had increased through the life of a project due to an increased understanding of and positive experience with the project's activities and visible outcomes for students.

Skills and expertise

The leadership and instructional coaching were designed to build skills and expertise that would outlast the grant. As was noted earlier, districts have trained internal district coaches and/or developed their own teacher leader teams within schools so that they could train teachers within schools when the project-funded, external training is completed. A district staff person was described as continuing the work,

> " She, as part of her other district leadership work, has partnered with some of the other instructional coaches, and they're doing basically kind of Saturday school for teachers. She's used a lot of the training that she's gotten through the SECEP project, and they're basically developing a teacher community of practice on these Saturdays. I see that as a nice transition into developing a more sustainable teacher community of practice where this can reside.

District staff did note the importance of ensuring continued support for professional growth and learning however. In particular, there were concerns about whether there would be sufficient resources and support to pay for professional development or for substitutes that are necessary when teachers must miss class to attend professional development.

Resources

Funding and resources were seen as important to sustain the college courses as well as the support for instructional change. There were several approaches that SECEP took to ensure that the project could be sustained. First, no grant funds were used to support student enrollment

in college courses (dual enrollment); instead, intermediary project staff helped the districts to develop Memoranda of Understanding with their college partners that addressed the funding for college courses. Second, the emphasis on developing the expertise of district and school staff to be coaches meant that those individuals could sustain the work.

Project staff also worked with district staff to identify organizations or partnerships that could provide financial or other types of support. In Connecticut, they were making connections with local foundations. In Michigan, the schools and districts had become part of the Michigan Early Middle College Association (MEMCA) and that network was seen as valuable. As one district coordinator said,

" There's no doubt in my mind it's going to sustain, and that's mainly because of that strong MEMCA network in Michigan.... I think the sustainability is keeping this network, keeping the focus on this, and to keep meeting so we know that we're working towards the same common goals.

Organizational culture shift

Sustainability requires that institutions align their practices to the goals of the project and institutionalize many of the activities, such that practice becomes routine. One of the key ways in which this was done was integrating the SECEP goals into the district's existing strategic plan. For example, one district staff member said that their district remained committed to implementing the STEM Early College Design Principles:

" We just rolled out our strategic plan and we have elements of SECEP embedded throughout, and one of those things is to provide access to college-level courses for our students. That's embedded within our strategic plan that spans from 2017 to 2020.

To support sustainability and next steps, NCREST is also collecting the key resources together and housing them in an online Community of Practice supported by JFF.

Conclusion

The STEM Early College Expansion Partnership provided an opportunity to explore what it takes to put comprehensive high schools on the road to transformative change. Results from the SECEP evaluation showed that, on average, the participating schools were making significant changes to their culture and practices. These changes were supported by a series of interrelated activities including: identifying districts whose improvement efforts were aligned with SECEP goals; creating management teams and implementation plans; providing ongoing support such as technical assistance, professional development, and coaching; and sustaining the work by embedding the SECEP Early College model into the day-to-day work of the districts and schools. This suggests that comprehensive supports are necessary to change comprehensive schools.

Endnotes

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