SCALING CHANGE

NATIONAL STEM CONSORTIUM

Transforming College Practices and Student Experiences to Advance STEM Education

The spotlight on community colleges has never shown brighter. The nation has made an unprecedented investment in community colleges to simultaneously increase college completion and stimulate economic recovery. Their comprehensive curriculum includes programs of study that enable students to find and retain employment and to continue their postsecondary education through transfer to the baccalaureate degree. With their historic open-access mission, community colleges are seen as an engine of opportunity to support unemployed and underemployed, low-income, first-generation, and other underserved students to secure employment during and subsequent to the Great Recession.

Several federal grants prioritized the role of community colleges in education and training in recent years, and one of the most substantial investments was the Trade Adjustment Act Community College and Career Training (TAACCCT) program of the United States Department of Labor (DOL). Beginning October 2011, these $2 billion capacity-building grants funded community colleges and their workforce and employer partners to prepare individuals for family living-wage employment that would in turn, provide skilled workers for industry sectors needed to recover and grow the economy.

Transformative Change means raising individual, program, organization, and system performance to unprecedented levels without sacrificing the historic commitment of community colleges to access, equity, and opportunity. (Bragg et al., 2014)

Recognizing the potential importance of TAACCCT to community college education, the Transformative Change Initiative (TCI) was funded by multiple foundations -- the Bill & Melinda Gates Foundation, the Joyce Foundation, and Lumina Foundation -- to research and translate lessons learned about sustaining and scaling change in the context of the community college. Our project hypothesized that change could happen in a multitude of places and ways and that careful documentation of change would be needed to capture the collective learning of community colleges under TAACCCT. We anticipated that programs and strategies would change as required by the grant, but so would partnerships, policies, processes, and practices that align with and support those programs and strategies. Some change would be short-term to administer the grant, but some may last for many years. Relative to TCI, our interest was in long-term change that had the potential to improve performance and result in more equitable outcomes for diverse student groups. Our vision of transformative change is not so much about implementing something brand new and innovative, though we see nothing wrong in this, but rather, about the potential for whatever is being changed to improve results for the increasingly diverse students who seek the opportunity to learn in the community college.

How is transformative change scaled? It occurs through spreading change through an iterative process of sharing, adopting, and adapting. Scaling is also about ensuring that change endures because it is embedded in the core functions of the organization (Century, 2007; Schorr, 2012). The concept of endurance also suggests that change is not abandoned when a grant ends or when staff turn over, but is supported and sustained for the period of time that is necessary to meet students' needs. Scaling is purposeful and strategic such that goals, functions, and results are changed and improved in fundamental ways, and those impacted by the change, such as the students who enroll in community colleges, experience verifiable benefits.

> "The TAACCCT program provides capacity-building grants to spur innovation and the development of model training programs at America's community colleges and universities."
>
> (TAACCCT Round Four Solicitation, 2014, p. 3)

Context

In the context of the community college, scaling change means that outcomes are improved at the same time as access is sustained. Raising the graduation bar should not come at the expense of the most diverse learners in all of higher education (Bragg & Durham, 2012). Thus, transformative change means increasing access and improving outcomes on all levels -- student, program, institution, and system -- to levels heretofore considered unattainable. The continuing priority of transformative change is to continuously improve outcomes such that equity gaps are closed. This is important for many reasons not the least of which is to reconcile the growing chasm between the haves and have-nots in our country (Martel, 2013). Without deliberate efforts by institutions like community colleges that have a historical commitment to social justice, it may not be possible to close these gaps, and in fact, the gaps may grow. Ultimately, recognizing that change is needed and that community colleges may be part of the solution, as envisioned in new federal investments, we sought to tell the story of how transformative change is being scaled by community colleges.

Based on our team's research on change in the community college, we identified seven guiding principles for the scaling transformative change. These principles are not intended to dictate action, but rather inform decision making about change. They reflect theory about scaling and sustainability, reflecting the input of community college practitioners and partners who have been actively engaged in various change initiatives. Using a principle-driven approach puts individuals who know the complexity of their settings and who understand the diverse student populations who enroll in their programs in the driver's seat to scale change. Guiding principles also create a blueprint for scaling and sustaining improved student results for all learners that in turn, enhance economic and social impact.

This brief is one in a series of four briefs that tell the story of how scaling and sustainability have happened under TAACCCT. The National STEM Consortium (NSC) is one of 23 Round One consortia and we highlight NSC because the colleges within the Consortium have demonstrated success in scaling and sustaining change. In this brief, the story is told of what mattered most in the Consortium's efforts to sustain and scale transformative change. The content for the story is pulled from multiple sources including NSC published materials, the NSC Strategy Brief published by TCI, the evaluation reports published by Hezel Associates, the third-party evaluator (TPE) of the Consortium, and phone calls and in-person conversations with individuals from multiple community colleges that were part of the National STEM Consortium. We acknowledge and thank all of the participants for joining with TCI in the story-telling endeavor.

National STEM Consortium

The National STEM Consortium exemplified a national commitment to build competencies in STEM fields. The group intended to address the increasing demand for STEM credentials, particularly training for jobs that required less than an associate's degree preparation. In examining the majority of training programs offered in the NSC college regions, the Consortium found a critical need for programs that offered flexibility for the adult student who was often employed and needed to stay employed while in school.

The Consortium included 10 community colleges in nine states with a TAACCCT grant of almost $20 million to design and implement one-year certificate programs in five technical areas: Composites, Cyber Technology, Electric Vehicle Technology, Environmental Technology, Mechatronics.

National STEM Consortium Colleges

- Anne Arundel Community College (Lead) - Maryland
- Clover Park Technical College - Washington
- College of Lake County - Illinois
- Cuyahoga Community College - Ohio
- Florida State College at Jacksonville - Florida
- Ivy Tech Community College of Indiana - Indiana
- Macomb Community College - Michigan
- NorthWest Arkansas Community College - Arkansas
- Roane State Community College - Tennessee
- South Seattle Community College - Washington

The group identified three key elements for the work of the Consortium: cross-Consortium collaboration to identify common goals along with regional needs; curricula with industry relevance; and expanded support for students, including accelerated remediation for those that needed it. A Vice President at Anne Arundel Community College, the lead college, identified the investment of the TAACCCT funds as transformative for colleges within the Consortium.

What is the Change?

Early academic leadership (Deans, Vice Presidents and Presidents) at the Consortium colleges acted as champions and facilitators for building the new programs and accompanying support services. Effective communication strategies were critical to the work for each of the colleges as well as the Consortium-wide efforts to implement the grant and focus on the deliverables. Individuals from each college participated in teams with diverse membership, including project staff, instructors, and employers. Regular meetings, both in-person and virtual, were held for individual teams as well as the full Consortium. To further facilitate the collaboration and communication, members had access to materials through an established file-sharing system. The file sharing system contained all procedural documents, technical team information, annual and quarterly USDOL reports, and meeting notes. Consortium leaders regularly issued guidance memos to all grant staff to articulate Consortium-wide procedures for important topics, including budgeting, reporting, material development, and curriculum development. The teams also

held bi-weekly conference calls throughout the course of the grant with project coordinators from all colleges and the five pathways to cover timely topics including student enrollment and curriculum development. In each grant year, representatives from all 10 colleges came together for 2-3 days, to interact face-to-face, sharing best practices and ideas, and addressing needed action items such as curriculum development (Hezel, 2015).

The next section describes the major activities of the Consortium to develop, implement, and evaluate the change strategies funded by the TAACCCT grant.

Industry-relevant Programs of Study

The Consortium sought to offer industry-relevant programs with the high likelihood of placement for students that would address the needs of regional employers for trained employees. In addition, NSC wanted to shorten the students' time to completion by offering the one-year certificate programs. NSC Project Director Susan Gallagher (2014) reflected that the members of the Consortium believed that the one-year certificate programs would benefit all stakeholders – students, colleges, and industry. With these certificates, the Consortium anticipated a high rate of completion, with a corresponding increased interest of students in the programs. With this increased interest and enrollment, the colleges would benefit from tuition revenue, and the industry-driven content would result in a high percentage of students getting hired. Finally, the local and regional industries and economy would benefit from the pool of skilled workers.

Five colleges took a leadership role in curriculum development to facilitate what was designed to be a deliberative and collaborative process that included the guidance of a technical team. Each team included employers who reviewed for industry relevance, subject matter experts (SME) who reviewed for content development, and a learning outcomes specialist who advised on instructional design. Each curriculum contained generally consistent core content with some specific credits embedded to match regional industry needs. For example, within Electric Vehicle Technology, one college trained for electric vehicle development, while another concentrated on service technician training. In the Mechatronics programs, the use of equipment differed by region to correspond with area industry. The Cyber Technology programs were very similar across colleges because they are focused on specific national certification exams.

After each curriculum was developed, a final team of SMEs reviewed it to ensure that it met industry standards and needed skills, and that the curriculum had the ability to be adopted by other colleges. Teaching toolkits were developed that provided course-level details for instructors to use, along with a Program Guide for each technical track that outlined essential elements of implementation, such as equipment needs and course materials.

The Consortium offered professional development for the instructors that focused on the content of the new programs to support the adoption of the curriculum and ensure quality. Some experienced course instructors visited other Consortium colleges to collaborate and share information on the subject matter area, while some provided online training in the form of webinars.

Student enrollment officially began in January 2013. As of June 30, 2015, 1,372 students had enrolled in an NSC program, which exceeded the Consortium's goal. About 80% of the enrollees were male students.

Looking at completion outcomes, 656 students had completed a program and earned a credential by June 30, 2015 (64% of the Consortium's revised goal due to receiving a no cost extension). The completion rate varied across the Consortium when looking at the various programs of study, including the number of enrollees and the number of programs offered by the colleges (e.g., the three colleges with the highest completion rate had fewer participants and they focused on one program whereas the three with the lowest completion rate offered multiple programs). When looking at gender, the completion rate for female students varied from higher than males in some programs, to similar or slightly lower in others (e.g. 7% in Environmental Technology (n=29) to 100% in Electric Vehicle Technology (n=6)). However, female students took longer to complete, in only 18% finishing in the expected timeframe. In considering race/ethnicity, whites were the largest group to enroll and complete across all of the programs. These results raise concerns about the relationship between equity and outcomes and deserve more attention to close equity gaps as the colleges continue to sustain and scale reforms associated with the TAACCCT grant to recruit, retain, and support student completion.

Timeline

October 2011	Received 3-year grant fall
2012	Curriculum development
May 2012	Selected by Project OPEN (CAST and OLI) for co-development of STEM Bridge
January 2013	First cohort enrolled
Jan –Aug 2013	First-Third modules of STEM Readiness implemented
March 2014	Received one-year grant extension
November 2014	Full STEM Bridge completed in OLI
2015	Course materials – guides, curriculum, and support materials placed in Skills Commons

Accelerated Remediation – STEM Bridge

Technical teams in each of the five programs of study developed a STEM Bridge curriculum to offer contextualized remedial content in four key areas: Math, Critical Thinking, Workplace Communication, and Professionalism. The development team included administrators, technical faculty, developmental faculty, and employers from all 10 Consortium colleges. The Bridge included two courses – STEM

Readiness and STEM Foundations. The Readiness course contained three units developed around workplace scenarios with multiple modules designed to embed competency development into the technical curriculum. The Foundations course contained 22 online modules designed to help students with greater need to develop skills prior to entering the technical program.

STEM Readiness was meant to allow students to review what they might have learned in the past, and Foundations was designed as a remedial course. For both, employers provided input for the development of scenarios specific to the technical program of study to cover topics including email communications, customer service skills, and troubleshooting. Implementation of the Bridge varied among the NSC colleges, with some allowing students to complete modules throughout their program and others requiring that students complete before beginning their program. Some colleges required all students to complete the modules, while others allowed students to decide if they needed the additional help (Hezel, 2015).

Student Support Services

Nine of the ten NSC colleges had a dedicated student support staff member, whom they called a navigator, for students in the STEM programs of study. Some navigators were full-time, while others were part-time. Two colleges combined the navigator and program coordinator role. The navigator's role was to work one-on-one or in small groups to guide students through their program. The navigator's activities included recruiting students (outreach and marketing), assisting with the admissions process (i.e., financial aid, registration), advising on course selection, helping students connect with college resources (i.e. tutoring, counseling), providing referrals to external services when needed, and connecting with employers to facilitate job placement.

Navigators were often the first point of contact for students who encountered problems, whether in their coursework or in their personal lives. Navigators were well-versed in external supports and referred students to services within the college or outside of the college. They guided students through the whole life cycle of the program, and by getting to know them on a personal level, were able to give tailored support.

In addition to working directly with students, navigators spent a substantial portion of their time on facilitating connections between employers and the students. Navigators worked to maintain existing relationships and establish new associations with local employers. This, along with their familiarity with students' abilities, allowed them to facilitate appropriate job placements (Hezel, 2015).

Employer Partnerships

NSC employer partners played an important role that grew over the course of the grant from initial input into the program design for the grant proposal through implementation and evaluation. Each college worked with companies who dedicated staff to serve in a variety of roles: advisory board members, curriculum reviewers, guest lecturers, providers of internships, liaisons between the colleges and industry associations, and providers of faculty professional development. Companies also provided internship opportunities, participated in mock interviews with students, as well as donating equipment for training. As a result of their interaction with program staff, many employers shifted their hiring practices to contact program coordinators or navigators directly, instead of publicly posting job openings. The new and enhanced relationships not only helped to ensure curriculum and industry alignment, but encouraged companies to streamline the hiring processes to employ graduates.

Sustaining the Change

Over the four-year grant period, NSC staff developed and implemented new curricula with supporting materials that were customizable to their regional labor markets. In the last two years of the grant, the Consortium members held discussions about sustainability and scale-up of the grant-supported initiatives, including gathering data to inform their discussions. Each college developed a draft sustainability plan in early 2013, and a Leadership Summit was held in November 2014 to bring together leadership from each college, including deans, vice presidents and presidents. The focus of the Summit was to share about the NSC strategies and their outcomes, and to brainstorm ways to sustain the work and the partnerships beyond the end of the grant. A team lead meeting was convened shortly after the Leadership Summit where the technical team coordinators further shared and agreed upon sustainability elements.

The Consortium held its final Summit in April 2015 to focus largely on sustainability and what relationships and partnerships should look like in the future. This meeting was attended by the grant management team, team leads, navigators, and other members of the Consortium from most colleges.

As part of their attention to sustainability, the Consortium went beyond what was required by the grant and tasked their external evaluator, Hezel Associates, with conducting an in-depth analysis of the NSC program components: block scheduling; cohort enrollment; compressed classroom time; employer linkages; hybrid delivery of material; navigator, and STEM Bridge. The evaluation project looked at each component with attention to implementation and effectiveness, focusing on the question, "What is the promise of the components of the NSC on community college education?"(Hezel, 2015). In 2016, our TCI team conducted document review and interviews with NSC Consortium members to investigate

> "[The navigator] helped the students in many ways, from registering for classes to completion of various forms to ensuring the students were getting what they needed from instructors. Without her remarkable diligence, I strongly suspect we wouldn't have been nearly as successful in completing the requirements of the program."
>
> (National STEM Consortium, 2015)

how the Consortium had sustained and scaled the changes that were implemented under TAACCCT. In our research, we learned that all of the original TAACCCT grant-funded strategies – curriculum, STEM Bridge, and student support – had been sustained to some degree at some colleges.

As part of the decision-making about sustaining programs, faculty and administrators in colleges across the Consortium considered a number of factors, including labor market trends, enrollments, and equipment and space needs. The final report by Hezel Associates, the NSC Consortium's third-party evaluator, noted that the Composites field continues to grow and evolve, implying that this program is likely to be sustained due to its importance to employers and students. Mechatronics also tends to be strong and expanding, with employers continuing to seek skilled workers.

As of April 2016, all of the initial certificate programs are sustained by at least one of colleges. The Environmental Technology program was sustained to a lesser extent because the colleges learned that employers prefer to hire individuals with an associate's degree. At one college, its program was still listed in the course catalog but had no enrollment due to lack of employment opportunities with regional industry. Beyond the question of sustaining the courses, the colleges faced the question of whether to sustain the processes that had been used to develop the curriculum. One college reported that they have embedded the mechanisms to update curriculum that includes the engagement of a technical team, even though the team membership has changed. In addition, Consortium leadership, college administrators, and faculty confirmed that the colleges are committed to securing the necessary resources for updating curriculum and equipment in the sustained programs.

Along with continuing the new programs of study, sustaining the navigator role was widespread within the Consortium. All NSC colleges with navigator services acknowledged this component's importance in helping students stay in and complete their programs. Colleges that did not include a navigator position noted that their students would have benefitted from one (Stewart, 2015). Within the Consortium, colleges understood the importance of the navigator as a staff member who was able to see the whole landscape and help students access services to stay enrolled and succeed. Multiple colleges have sustained the navigator position or functional areas of the position for students in the original programs of study. Some colleges have expanded the role to include services to students in other programs.

Consortium leadership also understood that colleges would face the challenge of identifying resources to sustain the positions. To assist the Consortium colleges as well as outside institutions in understanding the cost benefit of the navigator position, the Consortium developed and published a Retention-Revenue Calculator. The calculator provided a formula for determining the expected net tuition revenue that a college could receive from increased retention of students.

In making the decision about sustaining the STEM Bridge courses, colleges used data including feedback from students, staff, and instructors to consider what value the courses held. Based on the feedback, some of the colleges maintained components of the Readiness course, and most often the unit addressed professional and workplace readiness. The STEM Foundations course was developed to help learners build requisite foundational skills in math prior to entering the technical course. The Consortium expected this course to be of value for entering students targeted by the grant (e.g. individuals who had been in the workforce for many years and far removed from high school math classes) Finding that relatively few of the students entering the STEM programs needed remediation, the colleges did not sustain the Foundations course.

Spreading the Change

The Consortium dedicated time to spreading change that came about through the National STEM Consortium to other colleges and workforce providers and this section focuses on three of the innovations: curriculum; Bridge; and student support. Over the four-year grant period, NSC project staff engaged in a number of dissemination activities, including making presentations about the NSC Consortium and STEM Bridge at over 10 national conferences, participating in the Transformative Change Initiative, and developing multiple publications, including *Student Voices: Stories from the National STEM Consortium*. All of these activities were intended to share information about the new programs, along with the students' and instructors' experiences.

The TAACCCT grant required the NSC curricula (technical courses and STEM Bridge) to be available as an Open-Education Resource (OER) and the Department of Labor provided an online repository to house TAACCCT-created curricula and related support documents, called SkillsCommons. To facilitate access and understanding of the NSC materials, the Consortium developed and used a process for developing all the materials, including the teacher toolkits and program guides, that would ensure consistency for users. They developed naming conventions and posted materials together in ways to facilitate ease of access.

NSC also partnered with Carnegie Mellon University's Open Learning Initiative (OLI). Consortium teams worked with OLI staff throughout the grant period to develop and appropriately format the materials for the online platform. At the end of the grant, all technical tracks, composed of 68 courses and STEM Bridge modules, were made available on OLI and Skills Commons for free use (Hezel, 2015). OLI reported that colleges outside the Consortium are accessing the NSC materials and there is insufficient data available to OLI on how the courses have been adopted. Acknowledging the difficulty with identifying how many colleges have used the OLI resources to inform the launching of new programs, Consortium leadership provided the following examples from their experience and conversations with other colleges:

- 10-20 colleges launched Mechatronics programs.
- Cyber program being adopted and adapted by a college with a Round 4 TAACCCT grant.
- Courses in one industry sector being adapted for use in another relevant sector.

There are multiple examples of how the STEM Bridge Readiness course has been adapted for use in other settings, including other

programs at NSC colleges, other colleges, high schools, and middle schools. These examples include: offering to students in other STEM programs; offering to students who are dually enrolled in high school and community college technical courses; repackaging material for students in GED preparation program; and offering as *Employment Readiness or College and Career Readiness* courses for students in other programs. One employer indicated intent to use the course for employee professional development.

Several of the NSC colleges have adapted the navigator position, committing institutional funds or other grant funds to cover the cost to offer the services to students in programs beyond those connected to the grant. Specific examples include: using the navigator model within a new college-wide Career Services Center; splitting the role into multiple positions (recruitment/advising; advising/placement) for STEM students; offering services to students in other STEM programs; and expanding services to students entering with military experience.

Challenges to Scaling Change

The story of the National STEM Consortium is a complex one. NSC was a national consortium that included community colleges from across the country that came together for a defined period of time with finite goals tied to a federal grant. To implement their initiatives, the colleges found themselves needing to build capacity in systems that were not initially robust or nimble enough. For some, hiring project staff took several months at the beginning of the grant and college administrative systems were not able to accommodate various course delivery or enrollment options, or generate data to inform decision-making or reporting. These early challenges to implementation required significant attention from project staff and college partners.

The colleges also dealt with turnover throughout the grant period, including the turnover of administrators who were involved in the grant proposal development, staff who were hired on grant funds but left when permanent positions became available elsewhere, and the exit of staff when the grant ended. With newly hired people to work on the grant, the level of understanding of these staff members of community college processes and grant management varied as did their understanding of workforce partnership dynamics. This meant that many individuals involved in the NSC Consortium colleges were learning on the job.

The formal Consortium-wide conversations about sustainability were convened in the last half of the grant period, although some colleges reported having conversations about sustainability throughout the grant period. Upon reflection, the NSC Consortium leadership expressed a wish that Consortium-wide discussions had been initiated earlier with top-level college leadership, but recognized that personnel were instead "busy in the weeds trying to meet deliverables."

The NSC colleges came together to form the Consortium, establish new partnerships, develop and implement programs in five new areas, provide program guides for all of those courses in OLI and SkillsCommons, and collect and analyze data. They established professional networks, benefited from the collaborative work, and developed programs that were of interest to others outside of the Consortium. Staff from colleges across the Consortium acknowledged the strong positive effect of working within a program that built a model for intentional collaboration. However, now that the grant is over, no structure or formal support remains in place for continuation of the collaborative, resource-rich, data-driven activities that were the lifeblood of the group. Sustaining and scaling rests solely at the college level.

What We Learned about the Scaling Process

> "We went from thinking about getting the students in the door and to the 10th day to [thinking about] getting them into programs, retaining them, and seeing them complete and get jobs."
>
> (Clover Park Technical College grant leader)

As it was prior to the Consortium, the colleges are working independently to sustain or spread changes that resulted from their participation in NSC. In their efforts, the colleges face the need to address program development, delivery, and support services for a larger group of students than those enrolled under the grant. What was learned from the grant may need to be adapted to serve a broader group of students.

We found several examples of how the NSC colleges are applying their experiences to scaling change that are illustrative of the guiding principles of transformative change. The four especially important ones are:

- Strategic Planning and Leadership — Early academic leadership (Deans, Vice Presidents and Presidents) at the Consortium colleges acted as champions and facilitators for building the new programs and accompanying support services, which was critical to the success. As colleges now sustain and scale their changes, leadership across each college continues to be critical. One college is using the experience of participating in NSC as it undertakes a college-wide strategic planning process. Specifically, the college is interested in expanding the navigator role across campus, establishing campus teams to examine how to build capacity to spread the Readiness course to new programs, as well as using cohort scheduling as a model for other programs. At multiple colleges, faculty members and academic leaders continue to work together to develop industry-relevant curricula and program guides, implement new courses, and secure equipment.
- Equity and Outcomes — In addition to giving attention to enrollment and completion rates for diverse groups of students that include gender and race/ethnicity, college representatives talked about the need for programs to give attention to students

coming in with little or no college experience, as well as those with little or no technology experience (i.e. use of computers or experience with online instruction). Colleges have undergone a change in their program delivery to include or increase time for instruction as well as providing students with access to computers. Colleges have also shifted their organizational approach to enrollment management to reflect a commitment to attracting, retaining, and supporting completion for diverse students.

- Data — Multiple college leaders spoke to how participation in the NSC challenged and benefitted their capacity to gather and make use of data, including the need to strengthen their infrastructure in Institutional Research and data systems. Colleges moved from being data-poor to having improved staffing and greater college-wide awareness of and commitment to a robust data system. Illustrative of heightened attention to using data to inform the planning process, one college official spoke about using data to drive resource allocations, with specific plans to disaggregate data to inform the college's efforts to identify equity and outcomes goals.

- Partnerships — Colleges now face the need to establish priorities to sustain and spread the work with fewer people. Therefore, relying on the partnerships established with others across the college, with other colleges, as well as with local and regional workforce and industry will be critical to the process of moving forward. Examples of these continued and expanded networks include: three NSC colleges have submitted a proposal to the National Science Foundation for a project that will scale the Mechatronics program to include an Associate's program, as well as develop low-cost labs and provide professional development to scale the program to high schools. Other examples include: faculty working with navigators to provide student support; staff working with employers to expand internship and employment opportunities for students; and navigators working with new colleagues to share practices and expand student support services.

It is early in the scaling experience for the colleges that participated in the National STEM Consortium. Many continue to offer the grant-funded programs and services and engage with colleagues within their college and at other colleges to build capacity, to gather data, to give attention to the learning needs of their students, and to address employment needs of local and regional industry. Whether the change will endure is yet to be seen.

References

Bragg, D., & Durham, B. (2012). Perspectives on access and equity in the era of (community) college completion. *Community College Review*, *40*(2), 106-125.

Bragg, D. D., Kirby, C., Witt, M. A., Richie, D., Mix, S., Feldbaum, M., Liu, S., & Mason, M. (2014, February). *Transformative change initiative*. Retrieved from http://occrl.illinois.edu/docs/librariesprovider4/tci/brochure.pdf?sfvrsn=4

Century, J. (2007, Fall). *Fidelity of implementation: What is it and how do you measure it? UCSMP Newsletter*, 38, 6-9. Retrieved from http://bit.ly/1xYRkZl

Gallagher, S. (2015). *Building STEM Bridge programs for student success* [Podcast]. Retrieved from http://occrl.illinois.edu/tci

Hezel Associates. (2015, September). *National STEM consortium evaluation final report*. Syracuse, NY: Hezel Associates. Retrieved from https://www.skillscommons.org/handle/taaccct/5379

Hezel Associates. (2015, September). *National STEM consortium model report: An analysis of the NSC model components*. Syracuse, NY: Hezel Associates. Retrieved from https://www.skillscommons.org/handle/taaccct/5380

Martel, J. (2013, December 9). *Income analysis shows widening gap*. Retrieved from http://www.bankrate.com/finance/economics/income-gap-widening-2.aspx

National STEM Consortium. (2015, September). *Student voices: Stories from the National STEM Consortium.* Retrieved from http://www.skillscommons.org/handle/taaccct/844

Richie, D., & Gallagher, S. (2014). *Strategies for transformative change: Building bridges for student success*. Retrieved from http://occrl.illinois.edu/tci/strategies

Schorr, L. B. (2012, Fall). Broader evidence for bigger impact. *Stanford Social Innovation Review, 10*(4), 50-55. Retrieved from http://bit.ly/1yVwL3W

Stewart, S.P.,& Bolds, T.N. (2015, October). *Elements of a successful community college educational model*. Paper presented at the Transformative Change Initiative meeting, Chicago, IL.

United States Department of Labor. (2014). Solicitation for Grant Applications. Funding Opportunity Number SGA/DFA PY 13-10. Retrieved from https://doleta.gov/grants/pdf/SGA-DFA-PY-13-10.pdf

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Themes	Guiding Principle Statements	Your Experience
Transformative Leadership	Transformative change is scaled when "transformative leadership" is distributed, supported, and rewarded.	
Equity and Outcomes	Scaling transformative change requires a deep and abiding commitment to simultaneously improving equity and outcomes.	
Strategic Capacity Building	When organizational capacity for change is strategically planned, developed, and continuously implemented, transformative change is scaled.	
Policy Change	Systems, organizations, and individuals design and implement policy to guide, support, and scale transformative change.	
Partnerships and Networking	Individuals create and use partnerships and networks to access expertise, maximize resources, and form the backbone to drive and support transformative change.	
Data Utilization	Scaling of transformative change occurs when data collected through ongoing and responsive evaluation are used to change and grow impact.	
Intentional Communications	Transformative change happens when individuals with deep knowledge of change communicate to help others change in their contexts.	