Emerging Role of 2-year Hispanic-Serving Institution (HSIs) in Advanced Technological Education (ATE): Challenges, Opportunities, and Impacts for Growing the United States Technical Workforce

Cynthia Kay Pickering, Science Foundation Arizona Center for STEM at Arizona State University

Cynthia Pickering is a retired electrical engineer with 35 years industry experience and technical leadership in software development, artificial intelligence, information technology architecture/engineering, and collaboration systems research.

In September 2015, she joined Science Foundation Arizona (SFAz) to lead the Girls in STEM initiative and translate her passion for STEM into opportunities that will attract, inspire and retain more girls in STEM to make it the new norm. She has also architected SFAz's enhanced Community College STEM Pathways Guide that has received the national STEMx seal of approval for STEM tools. She integrated the STEM Pathways Guide with the KickStarter processes for improving competitive proposal writing of Community College Hispanic Serving Institutions.

Throughout her career, Ms. Pickering has written robotics software, diagnostic expert systems for space station, manufacturing equipment models, and architected complex IT systems for global collaboration that included engagement analytics. She holds a US Patent # 7904323, Multi-Team Immersive Integrated Collaboration Workspace awarded 3/8/2011. She also has twenty-five peer-reviewed publications.

She has recently been accepted to the Human Social Dimensions PhD program in Arizona State University's School for the Future of Innovation and Technology in Society (beginning Fall 2020).

Ms. Elaine L. Craft, Florence-Darlington Technical College

Elaine L. Craft (Florence-Darlington Technical College, Florence, SC-retired) holds a baccalaureate degree in chemical engineering from the University of Mississippi and a MBA from the University of South Carolina with additional graduate studies in mathematics at Francis Marion University. Her experience includes working as an engineer in industry as well as teaching and administration at community college and state levels. She served as Director of the South Carolina Advanced Technological (SC ATE) Center of Excellence from 1994-2017. She continues to lead initiatives and grant-funded projects to develop educational leadership and increase the quantity, quality and diversity of highly skilled technicians to support the American economy. She currently serves as Principal Investigator, Mentor-Connect: Leadership Development and Outreach for ATE-2 and -3; and, Principal Investigator, Collaborative Research-HSI ATE Hub-Diversifying the ATE Program with Hispanic Serving Institutions Using Culturally Inclusive Mentoring and ATE Resources. The SC ATE Center is widely known for innovative initiatives impacting advanced technological education as well as developing and broadly sharing successful educational models and practices in technician education, with a particular emphasis on faculty development, the first year of study for success in engineering and technology majors, and mentoring educators nationally. Craft is President of Elaine L. Craft Educational Consulting, L.L.C.

Caroline VanIngen-Dunn, Arizona State University

Caroline VanIngen-Dunn is Director of the Science Foundation Arizona Center for STEM at Arizona State University, providing services for Maximizing the Educational and Economic Impact of STEM. VanIngen-Dunn is the inspiration behind the programs and resources designed to assist community colleges, particularly rural and Hispanic Serving Institutions (HSIs), through a rigorous process leading to improvements in their capacity building, infrastructure, and proposal development efforts that support and better serve students in their STEM education and career pathways pursuits.

VanIngen-Dunn has built her career on years of experience as engineer and project manager in human crashworthiness and safety design, development and testing, working for contractors in commuter rail, aerospace and defense industries.

VanIngen-Dunn has an MS degree in Mechanical Engineering from Stanford University and a BSE degree in Biomedical Engineering from the University of Iowa. She serves on the University of Iowa's College of Engineering Advisory Board, and the YWCA Metropolitan Phoenix Board of Directors.

Anna Tanguma- Gallegos Gallegos, ASU

Anna Tanguma-Gallegos brings 10 years of STEM strategic planning and program management experience in higher education environments and initiatives. Anna has a history of promoting and increasing enrollment in the programs she manages, as well as developing collaborative relationships with corporate and community members. Anna has provided successful direction to federally funded programs within the higher education field. Anna spearheaded the relationship with Health Pathways Grossmont-Cuyamaca Community College District, and University of California-San Diego Moore's Cancer Center to develop their first-ever nursing internship summer program and offering a value-added learning experience for the students.

In her role at Science Foundation Arizona (SFAz), Anna is working with Hispanic Serving Community Colleges as part of the National Science Foundation (NSF)-funded KickStarter Program. The goal of KickStarter is to enhance the enrollment of Latino students in STEM fields by helping colleges with their STEM planning and maximizing the competitiveness of their federal grant proposals to fund those plans. As a Program Officer for the Community College STEM Pathways Initiative, Anna works closely with all community college teams, guides them through the KickStarter process, and connects them to community and industry partners.

Anna brings a unique skillset to this position with Bachelor's and Master's degrees in Behavioral Science/Educational Counseling from National University; CA. Anna is pursuing her Ph.D. in Psychology with an Emphasis on Integrating Technology Learning. Prior to SFAz, Anna was the Manager of Alumni & Community Relations for National University. Anna developed partnerships within the community colleges and non-profit industry throughout San Diego and Los Angeles for National University.

Assemblywoman Lorena Gonzalez and State Senator Ben Hueso recently recognized Anna for her work in the MANA De San Diego Latina Success Leadership Program.

Emery DeWitt, Florence-Darlington Technical College

Project Manager and Co-PI for Mentor-Connect, an outreach initiative for the South Carolina Advanced Technological Education (SC ATE) Center of Excellence, which is funded by NSF and housed at Florence-Darlington Technical College in Florence, SC. I started as Project Manager for another FDTC NSF-funded project (the National Resource Center) in March 2016 and became Project Manager for Mentor-Connect In April 2018. Prior to my Project Manager positions, I was Program Coordinator for the FDTC Educational Foundation for six years. I received my Bachelor of Arts in Public Relations and Sociology from Clemson University.

**Emerging Role of 2-year Hispanic-Serving Institutions (HSIs) in
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Abstract

To remain competitive in the global economy and meet the country's anticipated shortage of 5
million technically credentialed workers, the United States must produce skilled technicians with
a high level of domain-specific technical knowledge. Community colleges are essential to
solving the skilled technician workforce supply problem because many skilled technical jobs do
not require a bachelor's degree for entry but do require technical credentials. According to
federal data, half the students earning a certificate in 2016-17 received their credentials from
community colleges. Despite declining community college enrollments, Hispanic student
enrollment at community colleges nearly doubled between 2001 and 2017, increasing by 98% to
reach 25% of the overall 2017 enrollment.

However, Hispanics are currently underrepresented in STEM Job clusters, at 7% (1.2M) of
employed adults in STEM jobs (17.3M) as compared to 16% (21M) of all employed adults
(131M), where a substantial share (35%) of this STEM workforce does not have a bachelor's
degree. Moreover, the current Hispanic composition of the STEM workforce (7%) does not
reflect the current (18%, 62M) or future (predicted at 28%, 111.2M) Hispanic population of the
United States.

Looking to the future, the United States can help address underrepresentation in the STEM
workforce, by leveraging the more than 20 million young people of color, including Hispanic
youth, who have the potential to enter STEM fields and close the current gaps. Given the
nation's urgent need for a well-trained, domestic STEM-capable workforce, Hispanic Serving
Institutions (HSIs) are essential points of access; 46% of all HSIs are 2-year colleges.

The goal of the HSI Advanced Technological Education (ATE) Hub is to build capacity and
leadership at 2-year HSIs for developing competitive ATE proposals to NSF to prepare
technicians in advanced technologies that drive the American economy.

Introduction/Background

This paper is the second in a series of annual papers about the role 2-year Hispanic Serving Institutions (HSIs) have in educating technicians from underrepresented groups and how the National Science Foundation (NSF) sponsored HSI Advanced Technological Education (ATE) Hub program supports faculty at HSIs in improving Hispanic/Latinx student success. Last year's paper [1] described the research need, provided a project overview, included baseline and initial data, and discussed early lessons learned and their implications for future research. This paper describes continued fostering of the HSI ATE community (2-year HSIs with grant prospects and awards from the NSF ATE Program), resource dissemination, usage, perceived value to the community, and additional data gathered during the first and second cohorts of HSI ATE Hub, including adjustments based on learnings from year 1. Emphasis will be placed on HSI ATE Community building and resources. Lessons learned and implications for future research are also described in the paper.

Funded by the NSF ATE Program, the HSI ATE Hub is a three-year collaborative project implemented by Florence Darlington Technical College in South Carolina and the Science Foundation Arizona Center for STEM at Arizona State University. The NSF ATE Program is a workforce development program within the National Science Foundation that focuses on 2-year colleges and the preparation of technicians in advanced technologies that drive the American economy. Since the ATE Program was created by the Scientific and Advanced Technology Act of 1992, it has consistently been an excellent funding source for community college technician education programs. Of particular interest to ASEE members are the many ATE funding opportunities that can advance engineering technology and related programs that have pathways and articulation agreements for students to transfer to baccalaureate Engineering Technology and Engineering programs.

The approach for the HSI ATE Hub combines the strengths of the KickStarter STEM self-assessment, planning and research concept development by 2-year HSIs with the Mentor-Connect mentoring, technical assistance, and resources to support ATE proposal development and submission. Additionally, the HSI ATE Hub provides resources for faculty development and program improvements for advancements in technician education to better serve Hispanic/Latinx students who are currently underrepresented in STEM. The HSI ATE Hub also fosters growth of the HSI ATE Community by bringing together educators from HSIs who seek to advance technician education and create a mutually-supportive community.

HSI ATE Community Building

Engaging and fostering the HSI ATE community are important goals of the project that continued through four HSI ATE community building events held in year 2 of the project:
- 2019 High Impact Technology Exchange Conference (HI-TEC) Session
- 2019 ATE Principal Investigators' (PIs) Conference Panel with ATE PIs from HSIs
- 2019 ATE PI Conference Resources Demonstration Session
- Professional Development Webinar: Culturally Responsive Instruction for Students at HSIs

Attendees who added their contact information to sign-in sheets at each event were added to the project communication lists to keep informed about new resources, upcoming webinars, and other networking opportunities and events.

In July 2019, at the HI-TEC, approximately 21 people attended a discussion of the HSI ATE Hub, which included the demonstration of three types of resources: Bilingual videos, HSI Research Papers, and ATE Grant development Resources. At least one attendee was of Hispanic descent, 12 attendees were from HSIs, 12 reported that their Hispanic/Latinx students spoke English as a second language and had parents/families that do not speak/understand English. During the Bilingual videos, the audience was quite engaged and noted that often important context is lost when non-technical, generic translation services are used to translate STEM course materials to Spanish. In addition to resources already translated into Spanish, a resource that listed English to Spanish Translation Service Providers for STEM material would help them to produce quality content in Spanish. When asked whether they have ever been in a situation where the types of resources demonstrated might have helped in areas of need, the audience highlighted the following areas: best practices for recruiting students, targeted support, different pedagogical approaches, and effective instructional practices that are culturally relevant and culturally-sensitive.

At the ATE PI Conference in October 2019, a diverse panel of three ATE PIs from 2-year Hispanic Serving Institutions shared challenges and tips for engaging Hispanic/Latinx students and creating inclusive STEM learning environments where all students are treated as motivated learners and made to feel welcome. The HSI ATE Hub team video recorded the panel session and later included it as a resource in the HSI ATE Hub Resource Library for others to benefit from hearing about the successes and tips from experienced ATE PIs at HSIs. Along with personalized stories about incentivizing faculty and students, relevant resources for engaging Hispanic/Latinx students were also shared and discussed. The panel was moderated by an experienced Hispanic PI who runs an ATE Center. An audience of about 40 attendees posed questions to the panelists and gained their advice on topics such as planning ahead for when funding ends, connecting to students, and helping "anglo" faculty correctly pronounce students' names, for example. The discussion and advice around funding continuity began with building the core faculty team through professional development opportunities. Other strategies that were shared included tapping into the college participatory budget, forming relationships with community leaders who can influence the college president to continue the program, and building a data-driven case that shows impacts to student recruitment, enrollment, and retention. Panelists reported that when supported by data showing impact, these strategies can translate to dollars for the college, local employer sponsorship of programs, lab supplies, books, and student education expenses in return for a pipeline of future employees with needed skills. They pointed out the usefulness of enlisting advisory committee members who are committed to providing part-time jobs for students. Connecting to students, as well as showing compassion and interest in student academic challenges and achievements and their cultural roots, were emphasized. Participant examples included communicating with the extended family, having students write their pronouns, nicknames, and the phonetic spelling of their name on an index card for the

instructor on the first day of class, and the Mariachi Marching Band established at one institution as part of their cultural programming.

A second session at the ATE PI Conference, demonstrated to approximately 28 attendees how to find and access video resources to connect to Hispanic/Latinx students. Selections from the ATE TV Multicultural Bilingual Video Series and the Spanish translated Nanotechnology Modules, how-to videos, instructor notes, and student materials were shown to participants. A brief discussion about what would best support the Hispanic/Latinx community followed. The audience wanted to understand more about the Spanish translation of the STEM content, whether its context was correctly translated and if example speakers represented variations of regional cultures and local dialects of Dominican, Mexican, New Mexican, Puerto Rican, and Costa Rican populations. Translation to Spanish does not necessarily fit all of the needs of all Hispanic/Latinx populations. The group discussed this follow-on guidance: if you want to serve a particular community, you need to do some homework on the needs of the locale that you are serving and tailor the translation to fit the environmental context and its local dialect. They also recognized that custom translations could be expensive and time-consuming and suggested that the instructor could provide immediate value by describing the local context and leading the students in a discussion about how the video applies to the region and any important differences to address. Several participants in this session offered additional resources during and after the session for the HSI ATE Hub to consider adding to the Resource Collection. There was general agreement that identifying and sharing such resources is of great importance and help to HSIs in serving their Hispanic/Latinx students.

Professional development completed by a HSI ATE Hub co-PI in year 1 led to the staging of a Faculty Professional Development Webinar about Culturally Responsive Instruction in HSIs: Specific Instructional Strategies that Work. This live broadcast webinar, streamed to 96 attendees in early April 2020, extended awareness to the broader HSI ATE Hub community and provided tools that they could begin to use immediately. In this webinar, Dr. Melissa L. Salazar, CEO of ESCALA Educational Services, familiarized faculty and administrators with the concept of culturally responsive instruction as applied to the specific context of HSIs. Dr. Salazar's organization has worked with more than 300 HSI faculty and staff over the past 7 years to help close achievement gaps for Hispanic/Latinx students. The principles that underlie culturally responsive instruction were used to explain why certain instructional strategies are more important than others in HSIs [2]. A student survey tool was also provided to help faculty hone in on what students need and create a learning environment that is both academically rigorous and culturally balanced. Concrete examples showed how STEM faculty have used results of their student surveys and other practices to adapt their course(s) to be more culturally responsive, helping students feel welcome, respectful of each other's culture and backgrounds, engaged with STEM, and prepared for the cultures they may encounter as they transition to the workforce. Thirty-eight post webinar survey responses (a 40% response rate) indicated that the webinar exceeded expectations (47.37%) or mostly met expectations (47.37%). Survey respondents indicated that their confidence level to introduce culturally responsive instruction into their classroom/ institutions greatly increased (34.21%), improved (57.89%), did not change (5.26%), or decreased (2.63%). Responses about whether pre-webinar questions were answered included All answered (31.58%), Many answered (42.11%), Some answered (21.05%), None answered

(5.26%). The webinar recording, presentation materials and student surveys were packaged as resources and made available as HSI ATE Hub Resources. Ten days after the webinar, the recording had 50 additional views. A follow-up survey to webinar attendees is planned at six months to query if they have applied any of the recommended activities to get to know their students and their cultures and if so, the perceived outcomes.

Resource Types and Usage

Last year's paper described an extensive process for HSI ATE Hub resource curation and the initial four categories of resources:
1. Research papers and scholarly articles with data, theory, challenges, practices about HSIs and/or Hispanic/Latinx in STEM (R)
2. Success stories and/or examples of ATE programs involving HSI, Hispanic/Latinx, or underrepresented groups and institutions (S)
3. Aids for ATE Proposal Development and Award Management (P)
4. HSI Faculty Professional Development to enhance their cultural competence and leadership (FPD)

The four resource categories still hold for resource curation but have been refined to improve ease of use, searchability, and access to resources. The refinements came through recommendations from a member of the project's Advisory Council who performed an extensive analysis of the HSI Resource Hub website and resource library, as well as the User Guide. The alumna/veteran of Mentor-Connect recruited six faculty and deans at her institution (70% FTE Hispanic/Latinx student enrollment) to provide the perspective of an under-resourced institution with a third of its students enrolled in STEM programs of study. Initial contact with the VP of academic affairs and three deans in STEM areas, emphasized that providing feedback to the project was a great opportunity to learn more about ATE, and better connect to the broader HSI ATE community. The deans were requested to name two-three faculty members to provide feedback. Faculty members were honored to help and gave feedback with a focus on providing high quality resources to students and the community. The feedback was compiled and shared with the project team and the other Advisory Council Members. Many of the inputs have been implemented into the HSI ATE Hub website, Resource Library, and User Guide. Fine tuning the search engine to improve "cold" searches for resources is an ongoing effort.

Category 1, R, was refined as recommended to align with key themes in a recently published partner study, Transforming STEM Education in HSIs [3], also a resource featured in the HSI ATE Hub. The critical focus areas for STEM education in HSIs include: advising, mentoring and nonacademic support systems; STEM academic structure and related support systems; evidence-based pedagogies; equity, diversity and culturally responsive practices; and research experiences and high impact practices. The summary of critical focus areas in the study was used to orient the reader to the User Guide and the HSI ATE Hub website. The team continues to strengthen the resources available with additional links to research papers and evidence-based practices in the critical focus areas.

The metrics for HSI ATE Hub resource usage shown in Tables 1 and 2 tell us that Research Papers (Category 1 = R) are on average viewed more than the other categories of resources (Category 2 = S , Category 3 = P, Category 4 = FPD). Within Research Papers, Table 2 shows that resources that focus on all critical areas for STEM education at HSIs (All) are receiving the most views on average slightly higher than evidence-based pedagogies (EBP), STEM academic structure and related support systems (STEM A&S), and culturally responsive practices (CRP). In fact, the previously mentioned study, Transforming STEM Education in HSIs, has the highest views of all resources in the HSI ATE Hub (68), 43% more than the next highest number of views (39), and 59% more than the average of all other views with outliers removed (28). These data reinforce the recommendations of our advisory council and the analysis can be used moving forward to understand what types of resources resonate with our audience, along with qualitative surveys to the community about resources of value to them.

Table 1: Views of HSI ATE Hub Resources by Category and STEM Critical Focus Areas

Resource Title	Category	Critical focus area	Resource Views	More Info Views
Inclusion: Diversity, The New Workplace & The Will to Change	1=R	CRP	27	14
Active learning increases student performance in science, engineering, and mathematics	1=R	EBP	39	15
Defined by Outcomes or Culture? Constructing an Organizational Identity for HSIs	1=R	CRP	25	11
Women's interest development and motivations to persist as college students in STEM: a mixed methods analysis of views and voices from a Hispanic-Serving Institution	1=R	CRP	30	11
Institutional Agents at HSIs Using Social Capital to Empower Students	1=R	CRP	33	22
Transforming STEM Education in Hispanic Serving Instituitons in the United States	1=R	All	68	38
Decolonizing Hispanic Serving Institutions: A Framework for Organizing	1=R	CRP	27	19
Latino Faculty in Hispanic-Serving Institutions: Where is the Diversity?	1=R	STEM A&S	27	18
NSF National Resource Hub for STEM Education at Hispanic Serving Institutions	1=R	All	24	6
Excelencia in Education	1=R	All	37	14
LA RED TIG Week: Evaluar Con Confianza es mejorar/Evaluation with trust is improvement	2=P	CRP	22	18
Casa de Esperanza National Latin@ Network: Building Evidence Toolkit	2=P	CRP	31	10
Applying Design Thinking in Evaluation by Asma M. Ali and Isabel P. Cuervo	2=P	CRP	27	15
HSI ATE HUB Logic Model	2=P		0	26
KickStarter All Cohort Meeting Nov 2018 with HACU Guest Speaker John Aguilar	2=P	CRP	21	6
ATE TV Multicultural Video Series	3=S	CRP	20	15
HSI ATE Hub Synergy Session	3=S		0	14
ESCALA	4=FPD	HIP	27	13
Realizing the PROMISE of Success for Latinx STEM Students	4=FPD		0	13
NCCHC Leadership Fellows Program	4=FPD	All	31	13
National Community College Hispanic Council	4=FPD	All	28	11

Table 2: Average and Total Resource Views by Categories and STEM Critical Focus Areas

	Average Views	Total Views
Categories		
1. Research Papers	34	337
2.Proposal Development Aids	20	101
3. Success Stories	10	20
4. Faculty Professional Development	22	86
Critical Focus Areas		
Culturally Responsive Practices	26	232
Evidence-Based Practices	39	39
High Impact Practices	27	27
STEM Academic Structure & Support	27	27
All Critical Focus Areas	38	188

A bibliography of resources in the HSI ATE Hub resource library is included in the references [3] to [22].

Cohort 1 and 2 Data and Findings

The overarching goal of HSI ATE Hub is to increase the number of HSIs submitting competitive proposals to the NSF ATE program and test whether the KickStarter process improves the preparedness of 2-year HSIs to transition to Mentor-Connect and submit competitive ATE proposals. It is too early for conclusions about preparedness, especially in light of the small data set, but the number of HSIs submitting competitive proposals to the NSF ATE program has increased through the collaborative efforts of Mentor-Connect. One KickStarter HSI, a participant in HSI ATE Hub Cohort 1, submitted a proposal to ATE and remains under consideration for an award. Thirty HSIs have participated in the first six Cohorts of Mentor-Connect of which 23 submitted proposals to ATE, with an award rate of 70%. It is worth noting three declinations and two missed submissions during Mentor-Connect were later awarded ATE grants on subsequent attempts. Before the HSI ATE Hub, 10 HSIs from 3 KickStarter Cohorts submitted proposals to ATE, with an award rate of 75%. An additional 24 proposals were submitted to other NSF programs (e.g. HSI, S-STEM) by 2-year HSIs in KickStarter with an overall award rate of 50%.

Cohort 1

Of 32 total applicants to Mentor-Connect, 22 were accepted to the Mentor-Connect 2019 Cohort, including two KickStarter HSIs. During a blind review of applicants, one of the KickStarter HSIs placed at the top of the Mentor-Connect applicant ranking and the other placed mid-range.

The top ranked KickStarter HSI proposal team was coached by a Hispanic mentor and did not submit their proposal for several reasons. The mentor reported that faculty disagreed on proposal goals, objectives and activities. Efforts to involve industry were limited and an industry focus never developed nor matured. Faculty did not communicate proactively with the mentor about proposal development and the grant writer changed halfway through the proposal development process. Organizational support was withdrawn by the institution's Executive Director of Grants for these reasons, and because others at the college had been approached by NSF to submit a larger proposal for a different ATE project.

A non-Hispanic mentor with experience in delivering recruiting/retaining strategies for underserved populations to information technology (I)T educators at community colleges was assigned to the mid-range KickStarter HSI proposal team and indicated that intensive coaching and assistance was required for successful submission of their ATE proposal in October 2019. The faculty on this team were able to agree on the goals, objectives, outcomes, and activities for the grant proposal. There was regular communication between the team and their Mentor. A change in the assigned grant writer also occurred for this team, but it was early in the process and did not adversely affect the proposal development effort. In January, 2020, the PI was contacted

by a Program Officer at NSF with questions to answer. The team remains in funding negotiations with NSF.

Neither of the two Cohort 1 HSI ATE Hub teams identified with the KickStarter STEM teams at their institution, nor remembered being part of the KickStarter activities at their institution. The faculty who were absorbed into the Mentor-Connect Cohort and process were not original members of the KickStarter STEM teams, but were identified by leaders on the KickStarter STEM team at their institutions. Faculty were selected based on priorities and project ideas identified during STEM planning as part of the KickStarter program, and the Mentor-Connect requirement for two faculty as applicants for Mentor-Connect proposal development mentoring.

Cohort 2

Despite additional communications and dedicated meetings with nine KS HSIs to convey the opportunity to participate in the 2020 Mentor-Connect Cohort 8, Cohort 2 for HSI ATE Hub again consists of only two KickStarter HSIs, a smaller number than the goal of four. Communications began at the April 2019 workshop for new KickStarter HSIs where the Mentor-Connect PI spoke. Mentor-Connect representatives also joined the August KickStarter HSI Cross-Cohort Meeting, providing an overview, value proposition and an invitation to attend the September Mentor-Connect orientation webinar. The opportunity was also highlighted during several monthly ATE Workgroup meetings with KickStarter HSIs, during individual meetings with the 24 KickStarter HSIs, and by forwarding email blasts from Mentor-Connect about their orientation webinar, application process, and deadline.

Although three HSIs successfully applied to Mentor-Connect by Oct 11, 2019, only two were selected to participate. One was determined to be ineligible. This team was eliminated because a faculty member no longer at the institution had been awarded an ATE grant that started Sept 15, 2014. Although the faculty member and the NSF ATE grant award transferred shortly thereafter to another institution, the NSF ATE criteria for eligibility for a small grant for institutions new to ATE considers the award date and institution as originally funded. The ATE award in 2014 disqualified the HSI for the small projects new to ATE track as it was a performing institution for an ATE grant within the past 7 years. In 2021, this institution will become eligible for the small projects new to ATE track during Cohort 3 of the HSI ATE Hub.

Other KickStarter HSIs' reasons for not applying to Mentor-Connect were similar to those in HSI ATE Hub Cohort 1: e.g., competing priorities for larger, and/or different grant programs, including the Department of Education; inability to meet the two STEM faculty team requirement for Mentor-Connect; concern about switching to a different process and forming new relationships, when a great deal of time and effort had already been invested in the KickStarter process that they had originally signed up for; and competing priorities to meet the deadline to apply for Mentor-Connect.

Of 30 total applicants to Mentor-Connect, 22 were accepted to the Mentor-Connect 2020 Cohort 8. During a blind review of applicants, one of the KickStarter HSIs placed second within the Mentor-Connect applicant ranking and the other placed mid-range.

During the initial winter convening of Mentor-Connect in 2020, it was reported that the KickStarter HSIs strongly identified with the KickStarter program and enthusiastically shared their ATE project descriptions with the rest of the Cohort.

Comparison of Cohorts 1 and 2

Table 3 compares the characteristics of the HSIs that applied to Cohorts 1 and 2, based on data collected in their application to Mentor-Connect, assessment of their applications, assigned mentors, the mentoring relationship, ATE proposal submission, and award status.

Table3: Comparison of HSI ATE Hub Cohorts 1 and 2 Characteristics

HSI ATE Hub	KS HSI	State	KS Due Diligence	KS Engage Level	M-C Appl Ranking	Primary Author(s) of M-C Appl	Mentor Gender	Mentor Ethnicity	Coaching Intensity	Faculty Gender	Faculty Ethnicity	Proposal Submit?	Award?
Cohort 1 2019													
	HSI 1	NM	July - Oct	Medium	1	Grant Writer and 1 Senior Faculty	Female	Hispanic	Expected Level	1 Female 1 Female	Afr. Amer Caucasian	No	NA
	HSI 2	CA	Sep - Oct	Low-Med	mid-range of 32	Faculty Team and Grant's Office	Female	Caucasian	Intensive Level	1 Male 1 Male	Afr. Amer Caucasian	Yes	tbd
Cohort 2 2020													
	HSI 3	CA	June - Oct	Med-High	2	Faculty and Grant Writer	Female	Caucasian	tbd	2 Female	Hispanic	tbd	tbd
	HSI 4	CA	Apr - Oct	High	mid-range of 30	Faculty team	Female	Hispanic	tbd	2 Males	Caucasian	tbd	tbd
	HSI 5	NM	June - Oct	High	disquali-fied	Faculty team	NA	NA	NA	1 Female 1 Male	Caucasian Hispanic	NA	NA

Lessons Learned

Based on the first two years of operation, the HSI ATE Hub project team has learned the following lessons:

- Recruiting - new faculty participants from KickStarter HSIs not on the original STEM team that engaged in the KickStarter process need to be educated on the KickStarter context and how their ATE project fits into the STEM plan for their institution.
- Leaders on the KickStarter STEM team need to commit to continued support of the faculty during proposal development within the Mentor-Connect program.
- Mentoring - an intensive coaching style may be more important to successful proposal submission than mentor ethnicity.
- Resources - what people ask for and what the HSI ATE Hub team thought they needed sometimes differ, for example, what people ask for includes: Translation services, pronunciation guides, list of agencies/resources that address basic life needs of students before academic needs, e.g. housing, transportation, food before intrusive advising, tutoring services, and research papers.

- The HSI ATE Community likes to hear from people like themselves and from people who are like the students that they are trying to reach. Hearing from ATE PIs at HSIs on the panel at the ATE PI conference was very well received.

Conclusion

The small size of the ATE HSI Hub Cohorts (2-4 HSIs) and the three-year project duration will not provide evidence of significant increases in the capacity to assist <u>more</u> Community College Hispanic Serving Institutions (2-year HSIs) across the nation in developing competitive ATE proposals, beyond the numbers of HSIs the KickStarter and Mentor-Connect projects were already serving. However, in working together on the HSI ATE Hub project, the two programs have learned a great deal from each other and how to leverage each other's assets. Investments contributing to future capacity include lessons learned and case studies about the HSI ATE Hub Cohort members, sharing resources specific to serving Hispanic/Latinx Students in advanced technological programs, developing HSI faculty leadership and their cultural acumen, and building the HSI ATE Community. This forward-looking investment strategy will continue to grow capacity at HSIs striving to achieve ATE grant awards for years to come.

Implications for Future Research and Resources

- More emphasis on:
    - Cultural acumen professional development and related Resources
    - Success stories and case studies from faculty at HSIs
    - "Peer" Mentoring
    - Intensive Coaching - how to spot when it is needed, how much to assist, and how and when to raise expectations for mentees to invest more effort into proposal development.
    - More Research papers that map to the critical focus areas for Transforming STEM Education in HSIs
    - Improved dissemination and educator use of resources and evidence-based practices to better serve Hispanic/Latinx students in technician programs
    - Content Translation - understanding local context and different community cultures and dialects when translating content and examples for different Hispanic / Latinx populations in different regions.

References

[1] Pickering, Cynthia Kay, Elaine L. Craft, and Caroline VanIngen-Dunn. "The Emerging Impact of Community College Hispanic-Serving Institutions (2-year HSIs) in Educating Technicians in Advanced Technologies – Defining the Opportunities and Addressing the Challenges," presented at the 2019 ASEE Annual Conference & Exposition, 2019.

[2] D. M. L. Salazar, "Faculty as Change Agents", 2015.

[3] G. Lozano, M. Franco, and V. Subbian, "Transforming STEM Education in Hispanic Serving Institutions in the United States: A Consensus Report," *SSRN Electronic Journal*, 2018, doi: 10.2139/ssrn.3238702.

[4] S. Freeman *et al.*, "Active learning increases student performance in science, engineering, and mathematics," *Proc Natl Acad Sci USA*, vol. 111, no. 23, p. 8410, Jun. 2014, doi: 10.1073/pnas.1319030111.

[5] A. Ali and I. Cuervo, "Applying Design Thinking in Evaluation," *AEA 365*, 28-Sep-2018. [Online]. Available: https://aea365.org/blog/applying-design-thinking-in-evaluation-by-asma-m-ali-and-isabel-p-cuervo/.

[6] Pellet Productions, "ATE TV Multicultural Video Series," 2016. [Online]. Available: https://www.atetv.org/watch-videos/.

[7] "Casa de Esperanza National Latino Network: Building Evidence Toolkit." [Online]. Available: https://www.nationallatinonetwork.org/be-toolkit-home.

[8] G. A. Garcia, "Decolonizing Hispanic-Serving Institutions: A Framework for Organizing," *Journal of Hispanic Higher Education*, vol. 17, no. 2, pp. 132–147, Apr. 2018, doi: 10.1177/1538192717734289.

[9] G. A. Garcia, "Defined by Outcomes or Culture? Constructing an Organizational Identity for Hispanic-Serving Institutions," *American Educational Research Journal*, vol. 54, no. 1_suppl, pp. 111S-134S, Apr. 2017, doi: 10.3102/0002831216669779.

[10] "ESCALA Educational Services Inc.," *ESCALA Educational Services Inc.* [Online]. Available: http://www.escalaeducation.com/.

[11] "Home | Excelencia in Education." [Online]. Available: https://www.edexcelencia.org/.

[12] C. Pickering and E. Craft, "HSI ATE Hub Logic Model." FDTC and SFAz, 2018.

[13] E. Craft and C. VanIngen-Dunn, "HSI ATE Hub Synergy Session," presented at the NSF ATE PI Conference, Washington, D.C., 26-Oct-2018.

[14] J. Brown, *Inclusion: Diversity, The New Workplace & The Will To Change*, Second. Publish Your Purpose Press, 2016.

[15] G. A. Garcia and J. J. Ramirez, "Institutional Agents at a Hispanic Serving Institution: Using Social Capital to Empower Students:," *Urban Education*, Dec. 2015, doi: 10.1177/0042085915623341.

[16] S. Morales, "LA RED TIG Week: Evaluar con confianza es mejorar / Evaluation with trust is improvement," *AEA 365*, 19-Sep-2018. [Online]. Available: https://aea365.org/blog/la-red-tig-week-evaluar-con-confianza-es-mejorar-evaluation-with-trust-is-improvement/.

[17] F. Contreras, "Latino Faculty in Hispanic-Serving Institutions: Where Is the Diversity?," *Association of Mexican American Educators Journal*, vol. 11, no. 3, pp. 223–250, 2017, doi: 10.24974/amae.11.3.368.

[18] "National Community College Hispanic Council – Advocacy, Information, Networking, Support, Education and Training." [Online]. Available: https://www.ncchc.com/.

[19] "NCCHC Leadership Fellows Program." [Online]. Available: https://education.sdsu.edu/ncchc/index.aspx.

[20] "NSF National Resource Hub for STEM Education at Hispanic Serving Institutions," *HSI STEM Resource Hub*. [Online]. Available: https://hsistemhub.org/.

[21] L. Rendón, A. Nora, J. Ray, and J. Cabrales, "Realizing the PROMISE© of Success for Latinx STEM Students," Laredo Community College, Laredo, Texas, Policy and Practice Brief, 2018.

[22] K. G. Talley and A. Martinez Ortiz, "Women's interest development and motivations to persist as college students in STEM: a mixed methods analysis of views and voices from a Hispanic-Serving Institution," *International Journal of STEM Education*, vol. 4, no. 1, p. 5, Mar. 2017, doi: 10.1186/s40594-017-0059-2.