

Ivory Toldson:

Hello to all of the listeners and welcome to another episode of Collaborative Strategies for Inclusive Change. This is a podcast series sponsored by the NSF INCLUDES Coordination Hub, and the purpose of it is to highlight projects and partnerships that advance inclusivity in the nation's STEM enterprise. My name is Ivory Toldson. I'm a co-principal investigator for the NSF INCLUDES Coordination Hub. I'm also a professor of counseling psychology at Howard University and the president of Quality Education for Minorities. The goal of this podcast is to highlight how collaborations and partnerships address inclusion, equity, and broadening participation. We also discuss pathways, policies, opportunities, and practices that address institutional barriers to equity, inclusion, and broadening participation in STEM and careers. We are delighted today to have someone who is well qualified to talk about this issue, David Gruber. He is the director of the STEM Core Initiative at Growth Sector.

Ivory Toldson:

He has developed and implemented career pathways in the biotech, energy, utility, education and engineering sectors. David has served as an advisor to many companies, including Manpower, Pacific Gas and Energy, Public/Private Ventures, The Annie E. Casey Foundation, The Mott Foundation, Jobs for the Future, The Packer Foundation, and many state governments and local communities. And he's advised them on creating effective workforce and educational strategies. David is also a collaborator on the NSF INCLUDES STEM Core Alliance. The STEM Core Alliance does some very important things, including helping to change the way a college experience is facilitated through supportive and the second family for students at the institutions. Also changing the way colleges deliver math courses, the way employers view internships, and also the way faculty and counselors view student potential. So really this whole area of a growth mindset. So the first question I have for you, David, is what is the goal of your NSF INCLUDES STEM Core Alliance and what are the pillars you've identified as critical to preparing under prepared community college students for the STEM workforce.

David Gruber:

Thanks for that great introduction, and thanks for the opportunity. The goal of the STEM Core Initiative is to create a pathway to calculus and beyond the STEM careers for under prepared community college students who are the majority of all community college students. Calculus acts as a threshold for STEM, but also as a barrier for many community college students. And the issue basically is that the majority of students who come into community college, 60% or more, enter at the developmental level, and unfortunately few leave. Less than 5% of all the students who come into community college at a developmental level, and again, they're the majority ever get to calculus within three years, which means that less than 5% of this huge group of students have the opportunity to enter STEM careers, STEM education, and careers, especially in areas like engineering and computer science. One reason for this small number is that students are simply failing out of math, but we think a larger reason is that many students are deciding not to pursue higher level math or STEM pathways at all.

David Gruber:

And there are a couple of real barriers here we think. One, for many community college students, they just don't know about STEM career opportunities and have few connections to the STEM world. Also, STEM and math is a difficult and demanding curriculum, and a lot of students come into community colleges without the academic and social support they need to pursue it. A third issue that we see a lot is financial. Most community college students go to school part-time, and if you go part-time it's that much harder to take demanding courses like a STEM pathway. And then also there're low expectations.

Students sometimes have low expectations of themselves regarding math and STEM. And sometimes also we see faculty members and counselors who try and sometimes steer developmental students to easier career pathways than STEM. So the STEM Core Initiative is an attempt at least to address all of these barriers and put math in the larger context of some of these equity as issues, and it's built on five best practices or pillars.

David Gruber:

First, acceleration, students take the two or three courses in between elementary algebra and calculus in two semesters instead of a long and drawn out developmental sequence. Second, contextualization, as much as possible we try and connect the academic coursework students are taking in math to real world applications and students also take engineering and computer science workshops or courses during their STEM Core year. Third is a cohort based learning community. The students go through the STEM Core together... The 18 to 22 credits that are the STEM Core together. And so that we can help build social networks among them and give them some of the efficacy so that they can advance through college on their own. Fourth, and this is really a critical one, a student support specialist, and this is an individual who's assigned to work with each cohort. They go, they sit in class with them and they really help the students adjust to post-secondary education. They help the students realize the importance of study, put them in study groups, help them balance all the demands that they have on them with work and family and college so that they can better succeed.

David Gruber:

And then they also introduce STEM careers and opportunities to developmental students. And then finally, paid internships. Students who go through the first year of STEM Core have the opportunity for a paid internship. So those pillars are what we call the STEM Core Initiative. And it's really an attempt to restructure the developmental experience in community college for those students.

Ivory Toldson:

You said a lot of very important things, among them looking at the students that come and understand their relationship to STEM before they get to college. You mentioned that a lot of them don't have connections to the STEM world, and they probably have connections, it's just not in these traditional modes that neatly fit into an academic environment. One of the things that we focus on through NSF INCLUDES is collaboration and finding ways to implement strategies for STEM diversity through collaboration. What are some of the ways that you've approached this in your work?

David Gruber:

So we try and look at a couple of different ways to collaborate. One, of course is with community colleges themselves. We're working right now with about 30 community colleges, but we're trying to reach more. So our initiative is organized into regional hubs with a lead community college in each hub. So one way to collaborate is we've asked those hubs to reach out to other community colleges in their regions. We also try and take the opportunity for any presentation, any invitation which we can get to community colleges. And we've made presentations to state system in Nevada and also large members of community colleges in California. And then, I think, that maybe the most effective way with community colleges is just to rely on informal connection. We know that deans and faculty often move from college to college so we ask the deans and faculty we work with if any of their previous employers at community colleges they were associated with might be interested in the STEM Core.

David Gruber:

And we use that as a way to reach out to other institutions. A second way is professional association. We've been recently particularly starting to work with the 50K Coalition, which is a consortium of minority engineering associations and universities focused on increasing diversity in engineering. We presented at a recent convening they have, and really as a result of that convening and the connections we've made there, we've started to partner with that organization. And hopefully some of their constituent organizations on new initiatives really focused around transfer. A third area of collaboration, which was unexpected for us was universities. We realized early on that we had a common interest with universities because we both, we in the STEM Core and universities, want to expand and diversify their transfer pool. And I really have to credit the Coordination Hub for this, which connected us with a couple of universities that were interested in exploring those kinds of issues.

David Gruber:

So through the Coordination Hub, we were linked to North Carolina A&T, Florida International, The University of Hawaii and others. And really out of that connection have come several new initiatives and proposals. And then finally we try and collaborate with employers and industry associations. We were lucky to have an early employer, Lawrence Livermore National Lab, that's become a real supporter and they've helped connect us to the network of national labs. And then we've started to reach out to industry associations, which often are the gateway to their members and come with some built in credibility. So we're working with industry associations in California and Maryland and really looking for other opportunities there.

Ivory Toldson:

So talk a little bit about the outcomes of your work and how have you been able to sustain the efforts?

David Gruber:

Well, our goal, and of course NSF's goal too I think, is in scaling these alliance initiatives. So a lot of our work in this initiative, in addition to working with individual colleges to improve students opportunities to get to calculus, has been on building a system. So our first focus of course, has been in really scaling our current model with community colleges. So since we've started, we've added seven community colleges in three states. We've also added a number of employers who are interested in diversifying their workforce, including a number of national labs, NASA sites, and advanced manufacturers. One thing that we've been doing recently that I think is interesting is in order to reach veterans and people who are transitioning out of the armed forces, we've started to develop a partnership with Kirtland Air Force Base, which will target individuals who are within six months of transition and put them into a STEM Core program.

David Gruber:

So then they would have the opportunity of going on to STEM careers. But beyond just community college we also wanted to see how the STEM Core could be a foundation for initiative with other systems and other kinds of large STEM Core or STEM rather opportunities. So one place that we've looked is high schools and the potential for the same STEM Core Initiative that's delivered at community colleges to be delivered at high schools, to seniors as a dual credit initiative. So they get a head start on STEM and we reach an audience we wouldn't normally reach. So we've started that with a pilot program in New Mexico on a school that serves a large American Indian population, and so far it's going very well.

So we're really excited about that as an area for expansion. Another area is with partnerships with universities, as I mentioned.

David Gruber:

It's clear that the STEM Core can be the basis for a longer term transfer pathway. And particularly as a means to expand and diversify transfer in engineering and computer science. So we're now working with eight universities around the country and their community colleges, potential transfer pathways built on the STEM Core. And then another area is apprenticeship. The STEM Core in some places becoming the first step on a two year apprenticeship model. One example is in the Bay Area where the STEM Core is the basis for an apprenticeship with Tesla and four national laboratories. You also asked me about sustaining and obviously that's a very important issue for us and everyone else who's been funded by NSF. I think we're really lucky in that STEM workforce development is now I think a critical issue for federal funders, for state funders, for private funders.

David Gruber:

So there's really lots of opportunities out there. We in the STEM Core have raised over \$7 million since we first got our alliance grant from all those sources. And I particularly like to call out the Department of Energy, which has supported a \$3 million grant based on the STEM Core to expand and diversify the workforce that's going into the national laboratories. We've also found that foundations, as well as state governments are very interested in funding apprenticeships. That's a way to help sustain the STEM Core. As I mentioned earlier, K12 systems and community colleges are interested in dual credit and in bridge programs, which is another way to really expand some of the key elements that we've been working on. And then I think our most critical path and one that we've started on, but we really want to continue on is sustaining and funding internships, which are absolutely critical both to giving students an opportunity to understand the STEM workforce, but also to give them credibility with employers and universities as they continue their own STEM pathways.

Ivory Toldson:

That's excellent. Well, thank you so much for your work, David. Thank you for your continuing efforts to make sure that opportunities are accessible to all. We know that as the demographics of this nation change, we need to think about how we are delivering services to large sectors of the population that have not been served well by the status quo. And your ability to go against the status quo and really get people to change their minds, change the way that they think about this work and change the way that they do the work is so important. So thank you so much for your service to the NSF INCLUDES ecosystem and your service to these students who deserve it so much.

David Gruber:

Thank you, and thanks NSF and the Coordination Hub also, which has been very helpful to us in our work.

Ivory Toldson:

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