

Conversations with a Prominent Propagator: Ann Gates

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Encouraging faculty to adopt new, high-impact teaching practices, tools, and curriculum in computer science (CS) undergraduate education requires intentional planning and sustained effort. This article is the next installment in the series of interviews with prominent propagators: members of the CS education community who have successfully spread pedagogical or curricular innovations [2–4]. The goal is to capture knowledge and experiences that others can use to propagate their own teaching projects.

In this installment, we talk with Dr. Ann Quiroz Gates, Senior Advisor to the Provost for Strategic STEM Initiatives at the University of Texas at El Paso (UTEP). Dr. Gates is a founding member of the National Center for Women & Information Technology (NCWIT) [6] and a co-founder of the Computing Alliance of Hispanic-Serving Institutions (CAHSI): a national Alliance of institutions committed to recruiting, retaining, and accelerating the progress of Hispanics in computing [5]. She has served on committees for the National Academies of Sciences Engineering and Medicine, made recommendations to the US House of Representatives on STEM education policy, and presented to the White House Office of Science and Technology Policy.

Below are highlights of the interview, which ran approximately an hour. The transcript has been edited for clarity and style.

Q: For people who may not know, how would you describe CAHSI?

AG: CAHSI is a national alliance of Hispanic-Serving Institutions (HSIs). Our commitment is to accelerate inclusive educational culture, and in particular, our focus is on how we serve Hispanic students and faculty. An HSI designation is about enrollment, but CAHSI puts an emphasis on how an institution serves Hispanic students by understanding cultural aspects, emphasizing the role of leadership, staff, and faculty in fostering inclusive environments, and promoting the importance of shaping future leaders. And we do this by serving as a catalyst for research, institutional, and student capacity building. We work with four-year and two-year colleges, and we work with private and public sector partners. When we initially started in 2006 with funding from the National Science Foundation’s Broadening Participation in Computing (BPC) program, we had six institutions. And now we have over 80 HSIs and about 80 partners. We came together to collectively advance and empower Hispanic students in computing.

Q: What allowed you to grow from a small organization to your current size?

AG: When CAHSI was first formed, we stayed around seven to ten institutions. Then in about 2018, we applied for NSF INCLUDES funding. When that call came out, they asked for adoption of either a Network Improvement Community (NIC), or Collective Impact framework, and we chose Collective Impact, which has a number of elements¹ that align more closely with CAHSI’s approach to change. For example, our shared vision is that by 2030, 20% of those represented in computing will be Hispanic. By

¹ Collective Impact has five elements: (1) common agenda, (2) shared measurement system, (3) continuous communication, (4) mutually reinforcing activities, and (5) backbone support [8].

2030, the U.S. population should be 20% Hispanic, and we aim to reach parity. There are shared measures: CAHSI's set of measures center around institutional capacity building, student capacity building, and we identified the metrics to show our progress toward change.

Continuous communication and partnerships that lead to mutually reinforcing activities are the hardest ones to achieve. When you're such a large organization, how do you communicate with each other? How do you align the messaging? How do you get the messaging out without being burdensome? Communication has been a really big focus of ours. To address that, when we became an INCLUDES Alliance, we identified and funded an institutional lead for each of the four regions within the US that have the largest Hispanic populations. To assist the leads in aligning the efforts in each of the regions, we funded employees who we refer to as connectors and coordinators. In addition, we want to make sure that our partners share our core mission and are invested in accelerating the change.

The other element of Collective Impact is a backbone organization. For CAHSI, the backbone is at University of Texas at El Paso. I'm the executive director, and we have personnel who oversee student programming, research capacity building, and budgets. Each region holds meetings every two weeks to once a month. A backbone member sits in on those meetings to coordinate the transfer of information between the backbone and the region.

Moving to Collective Impact made a big change in how CAHSI operates. It allowed us to grow, and it provided the infrastructure that was sorely needed. Once we adopted Collective Impact, we were much more deliberate on how we operated and worked with our partners.

Q: What kind of commitments do you get from your member organizations?

AG: A lot of how we have run CAHSI was actually learned from NCWIT, where we created memoranda of understanding (MOUs) as part of getting a commitment from departments that wanted to be involved. With CAHSI, our experience of always being invited to proposals and not involved when the money was awarded led us to becoming adamant about commitment. That is, to become a member, the department must demonstrate commitment: if you're involved for a year, then we will request a letter of commitment or MOU signed by the dean and chair. Originally, we required signatures from presidents and chancellors, but that was too much of a heavy lift.

The commitment requires stating which CAHSI practices are being adopted. For us to understand impact, we need to collect data. So, the commitment includes working with CAHSI's Data Manager to collect departmental data.

Q: How do you make sure that a dean's or chair's commitment to CAHSI filters into what people do with their students?

AG: It comes back to the core purpose and what drives a particular administrator or faculty member. Where we get traction is from those who are committed to Hispanic student success. When you look at what's happening at any institution, you'll find faculty who are the drivers. They're the change makers at their university. And I can't always say that all faculty in a department are entirely behind Hispanic student success. In some places, yes, but you know that in departments, there are often naysayers. We had an NSF RED (Revolutionizing Engineering Departments) grant, and I remember fretting over the fact that not everyone was engaged in the change that we were trying to make. The evaluator of the RED program told me, "If you have two or three [faculty] who are not on board, that's fine. Just work with the ones who really care." And that helped me get over that. Not everyone has to support the change, but I'm really happy with the engagement we've had.

Q: How else do you spread awareness about CAHSI?

AG: We created an effort called CAHSI Advocates, who are students promoting what CAHSI does within their department and informing departmental industry partners about what we do. And we also established CAHSI Scholars, who are the next generation leaders: students who are developing their technical expertise beyond the classroom and who are also contributing to the community. Something that is so wonderful is that one of our graduates is at Johns Hopkins Applied Physics Lab and started selling CAHSI to her managers and got the lab to fund one of our sessions at the Great Minds in STEM conference. We had a meeting with the director who came to the conference last year, and he commented on how happy they were with their sponsored session, and that they would be coming back. So, we are creating an army of graduates who go out and spread the word.

Q: Would you describe your recruitment process as more top-down or bottom-up?

AG: People approach us on a regular basis, so we're not really going out and trying to get more partners. Just the other day at the Tapia conference, someone said, "We're an HSI now, and we don't want to reinvent the wheel. How do we partner with you so that we can begin to adopt your practices?" And so that's it: it's a grassroots effort.

We call our approach "grass-top"—the grassroots are faculty and students who are involved in change, and the top are the administrators who champion change. There's a new consortium, Hispanic-Serving Research Universities (HSRUs), that has brought together all the R1 HSI presidents and chancellors. Their goals are to double the numbers of Hispanic PhD students enrolled and increase the number of Hispanic faculty by 20% at their institutions. CAHSI focuses on computing and the HSRU is across all disciplines. While our common focus is on Hispanic student success, trying to sell what CAHSI is doing, which is discipline-specific, can be challenging. But we know that many of CAHSI's initiatives transfer across STEM.

Q: Have there been any challenges incorporating more research-intensive institutions into CAHSI?

AG: Initially, it was a hard nut to crack. It wasn't until we received funding from NSF to build research capacity. Ten research-intensive (R1) institutions joined CAHSI about a year and a half ago when we received funding from NSF to increase the number of Hispanics who go into and graduate from PhD programs.

Now we're working on what we call the Local Research Experience for Undergraduates (LREU) initiative. Many of our students can't spend a summer away because of family obligations and work responsibilities. We wanted students to have an opportunity to participate in research at their home institution and to align their research experiences to make them more attractive to PhD programs. Google is providing funding and cloud credits for partnerships between PhD-granting and non-PhD-granting institutions, to conduct research in areas of interest to Google.

CAHSI's Backbone is working with faculty to ensure that there is alignment regarding what it means to mentor students and support Hispanic student success. We require all faculty mentors to attend a half-hour meeting every week to learn about the Affinity Research Group model and discuss challenges they may be facing. We ask all faculty mentors to complete research plans with their mentees, and students must maintain a notebook with weekly research progress, what they learned, and what challenges they are facing. Faculty are asked to read and comment on the entries. All of this is part of mentoring and development.

Q: Can you elaborate on how Affinity Research Groups fit into your work?

AG: The Affinity Research Group (ARG)² model is focused on the deliberate development of student skills: professionalism, communication, cooperative teamwork, research. We use the term “deliberate development” to emphasize that you can't assume that students come to your research group knowing what to do. ARG makes skills development deliberate through a series of activities and constructive critique. We now have ARG professional development available through the Canvas platform.

Every year we give an ARG workshop at the Academic Career Workshop (ACW) [1] that's run by CMD-IT, CAHSI, and AccessComputing. It brings together doctoral students as well as faculty from underrepresented populations. ACW is offered every year, and this year in particular, a PhD student raised his hand at the end when we started to do reflections and said, “How do I get my professor to do this? Because I have never been exposed to any of this, and it would've really helped me.” And I said, “Well, just talk to him, and I'm happy to meet with him and share what we're doing.” I get that a lot. Someone else said, “I'm a new professor and I'm going to take this and use it.”

CAHSI also offers an awareness workshop focused on the importance of bringing together people with diverse experiences to solve problems. A lot of our work is around building cooperative, interdisciplinary teams and emphasizing that most research is not done as a sole researcher. Integration of different perspectives often leads to better solutions.

Q: To what degree do you think having a formalized name for it matters?

AG: I think it's good. We started talking about “ARGifying your workshops.” Don't just put people in groups to work on a problem. How do you hold each person accountable? There's five elements of being in a cooperative team. We ask: How are you incorporating those five elements? How are you thinking about individual accountability? How do you build positive interdependence and acknowledge contributions? How are you thinking about reflection and practicing a particular skill? That's what ARGifying a team effort means.

Q: How do you build a sense of community throughout all of CAHSI?

AG: We have two all-hands meetings every year. One of them is in person because there's just so much going on and new directions coming up. If we can't get our institutional representatives working together, then it's difficult to build community. At a meeting two years ago, we looked at enrollment and retention data and asked, “Where are Hispanics in the PhD programs?” The numbers weren't there. This motivated us to write a proposal to the NSF BPC program to build a model for recruiting and retaining Hispanics in graduate programs.

We had another successful meeting last year where we shared the completed data dashboard for the first time. We had many chairs in attendance, and everyone was highly engaged. They asked questions. They started sharing observations and ideas with each other. It was very powerful. That's the importance of these meetings: people aren't going to just look at the data. You have to give them time to look and think about what the data shows and what we can do differently, and share ideas.

Another example: a member of CAHSI, Maricopa Community College, presented their work at a meeting held at one of their campuses. A faculty member said afterward, “I had no idea this is what community colleges do. There's all these opportunities for us to work with them.” It's that kind of awareness that is important in our work. The upcoming meeting will be focused on what we're learning from the local REU experiences and engaging faculty in training regarding peer-led team learning and problem solving.

Q: How did you move from a workshop approach into a community model?

² ARGs are research groups in which students work in inclusive teams to learn cooperation and leadership in addition to computing and research skills.

AG: We're trying to create communities around ARG and Peer-Led Team Learning so that people can have access to resources and learn from each other's experiences. We ran a workshop on problem solving and realized later that participants needed more guidance. The same thing happened with ARG. We would run a workshop and everyone would be excited about what they learned. Then they'd go back to their department and realize that they weren't sure what to do first. That's when we added a video to demonstrate ARG in practice and included more reflection on what was learned. We also offered follow-up workshops. The Problem-Solving community of practice would meet every week or two and someone might say, "This is a problem I'm having" and another person might respond "Oh, this is how I solved it." Some PhD students got involved, and it really grew. Everyone was sharing, and it was a great learning experience.

However, we're revisiting this approach because of the time commitment. New adopters are saying, "We want to adopt this," but CAHSI doesn't want to just give them the material because it's nuanced. In our opinion, you have to have someone mentor and support you in adopting the practice.

Q: How else do you ensure fidelity of implementation for your practices?

AG: You can only download our materials if you enter your contact information. You are required to acknowledge that you will notify CAHSI if you use the materials. I don't know if this approach will hold anyone accountable, but that's what we ask. We encourage people to contribute their approaches and materials to the ARG repository, and we credit those who share their practices. ARG is not an original idea—it's a compendium of best practices. We collected and documented practices, and built the model around a cooperative learning framework.

Q: What advice would you give someone who is trying to get their new teaching ideas out into the world?

AG: As a computer scientist, I would say make sure you're working with someone with an education or social science background that can help you think through how to show the effectiveness of your approach. The next thing I would say is, you need to attend conferences such as FIE, SIGCSE, and ASEE, and meet people, share your ideas, and write papers to document it.

Q: How does CAHSI maintain a focus on teaching and mentoring even though many academics are incentivized to focus on doing "traditional research"?

AG: Well, we offer mentoring to Hispanic junior faculty. It's critical that they earn tenure and promotion, gain insights on how to work with upper administration, and understand their track to success, especially if they are at a research-intensive university.

That's also where conversations with presidents and deans become important. The work of CAHSI, which may entail working with students outside the classroom, is often seen as invisible service: i.e., it's not recognized. How do you start promoting the importance of interdisciplinary research and how do we begin to change faculty mindsets from deficit-based to asset-based? Leadership is critical for systemic change. Fay Cobb Peyton and I just wrote an article for Issues magazine in which we discuss how critical institutional leadership is in accelerating systemic change in STEM ecosystems [7]. We highlight three examples of leaders who have messaged the importance of student success throughout their tenure and who have led by example.

One framework to consider is Inclusive Excellence [7], which centers on organizational structures and culture, and the messaging that comes from the top. It's a dean saying, "We value this." And then how does that transfer to annual reviews? How do you begin to say, "We need to hire CS educators and value them as much as we do researchers"? That's the organizational culture. And then there's organizational behavior: What are people doing that shows that they value student success? Are such faculty achieving

tenure and promotion? That's really a discussion at the administrative level. The voices of faculty and staff also must be heard by administrators. What kind of inclusive pedagogical practices are in place? It's essential to have measures of excellence for the department, college, or university. There's a context for every university, and it's not one size fits all. I think what's heartening about the HSRU is that presidents and chancellors have committed to Hispanic student and faculty success, and it reinforces the idea that we're all in this together, and we care about making a difference.

It's a long haul though. Universal change centered on the success of all will likely not happen in my lifetime, but we have to continue to work toward reaching that goal.

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