The Many Facets of Diversity

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Summary

The panelists approach diversity from different points of view and experiences to produce a positive and productive foundation for an open discussion on the many facets of diversity, it potential, and positive impact on our profession.

Hilary Holz

Diversity in computer science stands in marked contrast to all other major science, technology, engineering and math (STEM) disciplines. The role and representation of women in the STEM disciplines has been studied intensively since the late seventies, resulting in a progressively deeper understanding of myriad aspects of STEM education. Women¹s representation and experience is by no means equal in many STEM fields, nonetheless, model programs have applied the results of diversity research, resulting in gains for women (and minorities) at all levels. Computer science has seen no such gains.

The lack of progress in computer science education takes on new significance when viewed in the context of the broader methodological gains resulting from the research into women in STEM education. One fundamental lesson of the last two decades is surely that successfully diversifying the pedagogy of a discipline strengthens that discipline for all students. Basic research on the difference between CS and other STEM fields needs to be done, so that practitioners can effectively exploit existing STEM education knowledge.

Our research approaches the problem of diversity in computer science via the lens of the disparity between the experience of CS and other STEM fields. Based on preliminary results, our current project focuses on the acquisition of computer science research methods (CSRM.) We are exploring formal and informal educational interventions. In order for our work to be replicable and generalizable, we are working with students, faculty, administrators and researchers in multiple institutions.

Ken Yashura

Diversity is and isn't about gender, race, and ethnicity Effective education strives toward offering all able students the opportunity to excel in their studies. Supporting a diverse enrollment requires teaching practices, courses, curricula, and student support that are designed with an understanding of the ways in which students differ. Particularly with the visibly white, male majority in our field, discussing diversity in terms of women and racial/ethnic minorities is convenient but comes with the threat of furthering negative stereotypes about intrinsic ability (or lack thereof) of these underrepresented students. As effective educators, we should place equal focus on attributes that more directly (and accurately) inform our teaching: our students' academic and social preparation, academic interest and motivation, and learning styles. This by no means justifies removing considerations of gender, race, and ethnicity from the discussion. Indeed psychology, sociology, and education research suggest exactly the opposite, because gender, race, and ethnicity are frequently correlated with the above attributes. In their landmark study of women in CS, Margolis & Fisher emphasize that cultural and curricular obstacles in CS tend to affect women more but also affect some men.

The challenge, then, is to plan our teaching practices, course designs, and curricula to not only accommodate but support the success of students of varying academic and social preparation, academic interest and motivation, and learning styles. At the risk of oversimplification, achieving a more diverse enrollment boils down to something the SIGCSE community has been doing for

years: making general (i.e., not ostensibly diversity-motivated) improvements in teaching. SIGCSE's recent emphasis on best practices in collaborative learning; lightweight, formative assessment (e.g., CATs); and learning
styles are all likely to help us more effectively educate a more diverse audience. (Notably, state institutions in Washington and California are required to frame any diversity efforts in gender- and race/ethnicity-neutral terms by anti-affirmative action legislation.)

The real challenge lies in understanding the obstacles that underrepresented students face in CS programs and focusing changes in teaching to directly address these obstacles. This not only helps "level the playing field" for underrepresented students but also results in an improved educational experience for all students. Understanding these obstacles is the work of CS education researchers, in cooperation with educational sociologists and the like. Again looking to Margolis & Fisher for an example, CMU decided to drop prior programming experience from its
admissions criteria when it found that (a) it did not correlate at all with long-term success in the major and (b) it filtered far more female applicants than males. This change contributed substantially to their famous increase in female enrollment.

Evans Adams

For the past 15 years, I have been the Computer Science Coordinator at Fort Lewis College in Durango, Co. Fort Lewis is unique in that we offer tuition-free education to Native American students from any recognized tribe. We get Native American students from all over the United States, including many from Alaska and a few from Hawaii. By virtue of our geographic location in southwest Colorado, we also attract many Hispanic students. We have an extremely small number of black students (mainly a few athletes), but a very rich ethnic diversity nonetheless. Approximately 20% of the student population of 4100 is Native American.

The impact on the entire campus is extremely interesting. We have a very prominent Anthropology program and our Center for Southwest Studies is home to many Native American artifacts. Our Native American Center serves as a meeting place and sort of a separate student union type of setting where Native American students can hang out with each other. There are also many programs which focus on integrating the Native American students into the broader campus culture.

The impact on courses and curriculum is significant. Many of the Native American students come from high schools on their reservations and many of them have very poor academic preparation. The campus has consistently received federal grants to try to bridge the gap between their high school preparation and our expectations for college freshmen. The retention rate for Native American students is very low, but they tend to keep coming back after getting suspended for a semester or two because of the free tuition and many of them eventually earn Bachelor's degrees.

I hate to generalize and stereotype, but the typical Native American student is often very shy, particularly when interacting with the white culture. Hence, team interaction is initially very difficult for them. I often try to have more than one Native American student, particularly in lower division courses on a team and have had some success with this approach. This semester, I am experimenting with pair programming its potential benefits to minority students.

John Beidler

I address diversity from the perspective of the **Agile Manifesto** (http://www.agilemanifesto.org/). Recall, the agile manifesto states,

> "We are uncovering better ways of developing
> software by doing it and helping others do it.
> Through this work we have come to value:
>
> **Individuals and interactions** over *processes and tools*
>
> **Working software** over *comprehensive documentation*
>
> **Customer collaboration** over *contract negotiation*
>
> **Responding to change** over *following a plan*
>
> That is, while there is value in the items on
> the right, we value the items on the left more".

Consider the four items on the left. What is the impact of diversity on the four items on the left? My claim is that addressing diversity, by which I mean doing, instead of just talking, directly improves our ability to address three of the items on the left – individuals and interaction, customer collaboration, and responding to change – resulting in a positive impact on working software. My presentation focuses on how addressing diversity enhances the career opportunities of our students.