Teaching Active Participation and Inclusion

My goal as educator is to shepherd our youth toward being better people by building knowledge, skills, and empathy. I encourage students to be creative, to actively participate, and to cherish mutual difference. I like to teach a range of courses: introductory, to bring students into our fields; mid-level, engaging students with skills and each other; advanced, to share and develop cutting edge research acumen. Workshops on teamwork and inclusion address how cooperative work is hard. Team projects require students to deal with each other.

I emphasize project-based learning, constructivism, learning through doing, because I find that it's more rewarding. Knowledge and skills stick a different way in the mind when you use them in making. Project-based learning stimulates thinking about what skills are for, in situated contexts. Projects provoke creativity in formulating problems and plans. I teach students to ask good questions, not just to know right answers.

Teaching is a two-way street. *I* continuously *learn* through teaching. I learn through teaching, because its situated contexts provoke me to think on my feet about what students need, how to explain, how to impart, and how to inspire. Student participation gives a professor intellectual and emotional challenges, which stimulate growth. I work to keep my teaching alive, to be the student through teaching. I work to keep fulfilling my intention to continuously make the world a better place, and myself a better person, through community.

In the future, I intend to design and offer innovative introductory courses in computational / informational literacy. To do so, I will draw on my backgrounds in the arts, design, the humanities, and the social sciences, in addition to computer and information science and engineering, and human-computer interaction (HCI). I will present computing / information as culture. I will explicitly incorporate diversity, inclusion, and ethics. I will craft creative individual and team assignments, in connection with the news and popular social media, in order to draw people with diverse backgrounds into active roles in computing, data science, and information.

I support and advise undergrad and graduate student researchers. I involve my advisees as participants and collaborators in all phases of research: (1) design; (2) building probes; (3) collecting data; (4) data analysis; (5) writing papers; and (6) writing proposals. They learn skills across this gamut, in proportion to their effort.

I teach undergraduate 'half capstone' design (aka *Programming Studio*), graduate Human-Centered Computing, and advanced seminars. Half capstone initiates students' transition from skills to project-based learning. I overhauled the curriculum, forming an interdisciplinary course—integrating software design, interaction design, visual design, and experience design—with qualitative methods and agile task analysis. One project requires teams to design and build an engaging multi-player game—using JavaScript, Node.js, MongoDB, WebSockets, CSS, and HTML—so it runs in a web browser. Student response is motivated and creative.

While teaching Programming Studio, my most profound experience as a teacher emerged. Students struggle to work in teams. I find, disproportionately, that female students show up in my office with bad team experiences. I am ethically compelled to make computing courses as places where people who are underrepresented become inspired, not discouraged. In response, I iteratively create and facilitate a participatory inclusion workshop, *Teamwork: Gender + Race* (See Diversity Statement.)

I collaborated to create CSCE 655 Human Centered-Computing (HCC), a graduate human-computer interaction methods course, to introduce iterative design, prototyping, visual / interaction design, evaluation, data collection and analysis, information visualization, computer-supported cooperative work, social media, game design, and ubiquitous computing. Texas A&M CSE adopted HCC as a core graduate degree requirement.

I periodically teach seminars to engage advanced student participation in cutting-edge research. The fields are interdisciplinary. Participants integrate fundamentals with prior work. I worked to canonize Advanced Seminar in Human-Centered Computing and Information. Students can repeat this course; its topic differs in each offering. I share the mechanism with colleagues in HCI, graphics, visualization, and information.

Diversity in Participation: Transforming Teamwork and Organizations for Justice / Empathy / Excellence

I am committed to diversity, to the equal representation of heretofore underrepresented peoples in computing, STEM, and more broadly, in society. I commit to diversity as a matter of justice. I commit to diversity as a matter of empathy. I commit to diversity through creativity theory, which identifies diversity of ideas, and of their sources, as an ideation metric for excellence. The field of human-computer interaction is based in understanding, imagining, responding to, and fulfilling "user" needs. How can user needs be fulfilled without the participation of diverse, representative users and leaders? Diversity is a key to human-centeredness.

Addressing diversity runs throughout my life and work—as parent, program director, teacher, advisor, and researcher—in concert with my research focus on participation and creativity. Serving as as a the single father of an 8-year old, in the pandemic, has put me in touch with inclusion issues in a new way. When the press began publishing articles about moms not being alright in the pandemic [1, 2, 4], I began to identify as a mom. I face all the issues of a primary caregiver, writ solo. Usually, primary caregivers are women. I became more aware of the privileges I had previously experienced, even as an active parenting dad. Widowed in the pandemic, I was directly put in touch with issues that moms face. This provokes me to confront other aspects of my privilege and, as a result, to be more empathetic.

As a program director, I work for diversity in the funding process. I work to incorporate inclusion into how I direct funding panels and my lab. At NSF, 58 % of my panelists have been women. When I counted, I found that 68% of my awards happen to have gone to women. In panels, I have consistently worked generally to build community and specifically to take care of the needs of parents. In a plurality of cases, women have more parenting responsibility. I tell panelists that building community includes creating safe space and that all participants' voices count equally. One way I model this is to work to not apologize when my son occasionally interjects himself into the Zoom. Through this process, along with assurances of understanding and safety, I have been successful in recruiting and including mothers of young children as panelists.

As an educator, I felt compelled to initiate a set of participatory workshops, titled Teamwork: Gender + Race, when I observed that the already small cadre of young women in my half capstone course, Programming Studio, were disproportionately having trouble with their teammates. My position began: underrepresented people will not become discouraged about careers in computing on my watch! My job includes fostering mutual empathy. I am developing connections with Undoing Racism organizers to deepen my involvement in this work.

The Teamwork: Gender + Race workshops that I began, in 2016, to design and facilitate are presently based in articulating, understanding, and extending a set of supremacy culture problems [6] and their antidotes:

- power hoarding $\longrightarrow$ power sharing
- perfectionism $\longrightarrow$ space to experiment
- defensiveness $\longrightarrow$ creative vulnerability
- paternalism $\longrightarrow$ participation
- fear of open conflict $\longrightarrow$ safely debate + resolve
- individualism $\longrightarrow$ shared goals

In the workshops, students expressed feeling safe to work on their own problems, as well as those they encountered. In one, I was able to help repair team dynamics that excluded a Latinx woman. Another young woman fostered empathy by sharing her experiences of social exclusion, in which guys don't want to date her when they find out she is an engineer! A third student participant said, "It was at once valuable and uncomfortable to talk about my own problems and issues we had with each other." A fourth said, "The skills

we are learning [in the workshops] are also relevant to organizations and personal relationships." The students said they had not encountered this kind of material before.

I intend to incorporate evolving forms of this workshop into other courses involving teamwork, my own and those taught by others. I recognize that panels and student projects serve as lenses into underlying issues of racism and sexism that pervade our personalities and experiences. We must work on undoing racism and sexism in ourselves in order to transform ourselves, our organizations, and society to fundamentally become more participatory, empathetic, and democratic.

I work to incorporate inclusion in how I direct the Interface Ecology Lab. As an advisor, I've had the privilege to work closely with amazing students from groups underrepresented in STEM. These include 3 PhD students, 3 masters, and 16 undergraduates. The result is that I am fortunate to have 58 co-authorships with advisees underrepresented in STEM on published research papers. In the lab, I work to foster an environment of mutual respect and support, in which people are accountable and open. I'm able to gently but firmly confront lapses. This has included addressing respecting and fostering collaboration with a spectrum of gender identities and disabilities, as well as race.

In creative cognition, diversity serves as an ideation metric [3, 7, 5]. Diversity is understood as a means for the creative generation and development of new ideas. We measure the diversity of their sources and topics. Recontextualizing this principle, a diverse group of people has the potential to develop stronger creative ideas than a homogenous group, because more perspectives, understandings, viewpoints, cultures, and life experiences become involved. Diversity of participation is thus a principle both for justice and for excellence.

Avenues for improving diversity emerge across academic life. Courses, hiring, research, and funding are all involved. Feedback loops can be beneficent or pernicious. Building community is key. Intention, energy, and humility are required for creating and sustaining transformation.

References

[1] Davenport, M. H., Meyer, S., Meah, V. L., Strynadka, M. C., and Khurana, R. (2020). Moms are not ok: Covid-19 and maternal mental health. *Frontiers in Global Women's Health*, 1:1.

[2] Grose, J. (2021). America's mothers are in crisis. *New York Times*.

[3] Guilford, J. P. (1966). Measurement and creativity. *Theory into practice*, 5(4):185–189.

[4] Joyce, A. and McCarthy, E. (2020). Working moms are not okay.

[5] Kerne, A., Webb, A. M., Smith, S. M., Linder, R., Lupfer, N., Qu, Y., Moeller, J., and Damaraju, S. (2014). Using metrics of curation to evaluate information-based ideation. *ACM Transactions on Computer-Human Interaction (TOCHI)*, 21(3):1–48.

[6] Okun, T. and Jones, K. (2000). White supremacy culture.

[7] Shah, J. J., Smith, S. M., and Vargas-Hernandez, N. (2002). Metrics for measuring ideation effectiveness. *Design Studies*, 24(2):111 – 134.