

TEACHING | STACY M. BRANHAM

Overview

As an instructor and advisor, my goal is to **create inclusive spaces where students feel excited and empowered to learn skills that enhance our world**. Specifically, drawing on my background in Computer Science and ongoing research in Human-Centered Computing, I aim to teach students how to design technology with a critical awareness of its relationship to politics and society. To achieve these goals, I practice **evidence-based education**.

Classroom Experience

I have taught at the **graduate and undergraduate** level in **seminar-style, lecture-style, and active-learning-style** modes, with class sizes from 25 to 40 students. I have taught Fundamentals of Human-Centered Computing (HCC 629), Management Information Systems (IS 300), and Computational Thinking and Design (COMP 101).

Example: Teaching practice

My work in COMP 101 demonstrates success of the iterative, evidence-based approach I take to all courses I teach. COMP 101 is an introductory course for first-semester computing majors. Initiated with NSF funding in 2012, the course aims to foster diversity in computing by increasing student retention using team-based learning [10] and peer-led team learning [12]. These methods are used both to teach coding skills and to develop academic/career success skills. Since taking over course management in Fall 2015, I have successfully scaled up from one section to three; institutionalized funding for staff through negotiations with the Office of Undergraduate Education; and made thoughtful contributions to the curriculum, which I further describe below.

Analysis of the course's impact prior to Fall 2015 revealed higher three-year retention rates, but lower performance in follow-on programming courses. I therefore focused on enhancing students' programming proficiency without displacing activities that teach academic/career success skills. To assess obstacles to technical learning, I studied weekly quiz results, administered regular surveys, and spoke directly with students and Teaching Assistants. I found that (1) students were losing focus during in-class lectures and, (2) students were not practicing programming outside of class. I adjusted my teaching practice in the second half of Fall 2015 by breaking lectures into 10-minute segments punctuated by active application of the concepts [9,10]. I introduced in-class video tutorial activities [3] that were so popular, I made them weekly at-home assignments in Fall 2016. To evaluate the effectiveness of these changes, I requested a midterm student assessment from UMBC's Faculty Development Center [8] in Fall 2016. The assessment revealed that students overwhelmingly found the video tutorials and in-class coding helpful. Students believed there was a good variety of teaching methods--team work, individual work, tutorials, and lecture--and requested even more in-class coding. This Fall 2017, as I teach the course a third time, I am therefore including coding activities in every class period and continuing to collect regular assessment data.

Teaching effectiveness

Assessment of longitudinal goals requires more than two semesters of data. Short-term feedback, however, suggests that I am improving, and so are my students. In Fall 2015, summative student evaluations ranked my overall teaching effectiveness at 3.75 / 5.00. By Fall 2016, that measure had risen to 4.60. Last semester, in my other courses (HCC 629, IS 300), scores rose further to 4.80 (up from 3.14 the previous year) and 4.90 (new prep), respectively. Anecdotally, I have observed an increasing number of past students contacting me to share their appreciation of COMP 101. For example, a student who took the class in Fall 2016 recently emailed me: "Your class made me extremely prepared for my IS 147 class. From once coming to COMP 101 without any experience, now I'm one of the most experienced in my class!" For the contributions I have made through COMP 101 and related efforts, I was recently honored with a nomination by the Dean of the College of Engineering and Information Technology to represent UMBC as a candidate for the **national Outstanding First-Year Student Advocate award**.

Advising and Mentorship Experience

I have supervised Interdisciplinary Studies majors, summer D/REU students, and Independent Studies with both undergraduate and graduate students. Most recently, I managed a team of two funded PhD students, an MS student who is now my MS thesis advisee, and an undergraduate student from 2016 to 2017. I led the team to publish two full papers and three posters that students successfully presented at top conferences. In all, I have **published with five graduate and four undergraduate students** [1,2,4,7,11,13]. In addition to research advising, I am a formal **Center for Women in Technology student mentor** and an informal mentor to numerous others.

Example: Advising practice

I make deliberate efforts to recruit and work with a diverse group of students, which has recently included a blind Ph.D. student, a transgender student, a wheelchair user, and a student with a cognitive disability, and several women or people of color. As my own research has demonstrated [5], working in diverse teams is a source of strength, but can also pose novel technical challenges to effective collaboration.

For example, our team found in Summer 2016 that Microsoft Word makes it extremely difficult for screen reader software (technology that enables blind individuals to use visual displays) to Track Changes in paper drafts. I led the team in discussions of possible solutions as we worked toward the Fall papers deadline for CHI 2017. The team concluded that simply planning more time for revision cycles would enable equal participation for all members. We named the effort “moCHI” (meaning “mock CHI” deadline), and we **developed a set of five milestones leading up to a week-early internal paper deadline**. I organized weekly team meetings, delegating agenda-setting to the first author, a third-year PhD student. I also met weekly with the lead author one-on-one and offered meetings to other team members on an as-needed basis. To motivate productivity, I shared Japanese mochi (as in moCHI) treats with the team at the successful completion of each milestone. We met our mock deadline, with a week to spare for refinements, and **our paper was accepted at CHI 2017**. In our debrief meeting, the team agreed that the approach was successful and preferred by all members, so we used it again for **our ASSETS 2017 submission, which earned all 5-point marks from reviewers** and was presented in early November.

Example: Mentoring practice

One strategy I have used to improve teaching and support for COMP 101 students is to engage undergraduate course alumni on a volunteer basis or in Independent Studies related to the Scholarship of Teaching and Learning (SoTL). Working with me individually or in small teams, students have: studied student-to-student microaggressions in team-based learning settings; developed a lesson plan on diversity challenges and minority resilience in computing; designed undergraduate research information sheets for an in-class activity with freshmen; redesigned the departmental Tutoring Center to be more spacious, functional, and inviting; organized a “Coloring Day” event to build community amongst freshmen women and senior peers; and designed a course logo and website to disseminate lessons learned from COMP 101 to other institutions.

Tapping the talents of COMP 101 alumni to achieve course learning objectives has built relationships that benefit the University as well as the students. As one measure of success, the quality work performed by these students enabled me to write over 20 strong recommendation letters, helping some earn top honors, including NSF’s GRFP Fellowship and admission to Ph.D. programs at Georgia Tech, UPenn, and Harvard.

These examples illustrate my teaching philosophy that all students can learn and excel if educators take an evidence-based approach, promote learning environments that practice inclusivity, and engage students in educating themselves and their peers.

Future Teaching

I am comfortable teaching previously-taught courses (marked with **) as well as expanding my repertoire in the following areas: **Human-Centered Design** (Foundations of HCD**, CSCW**, Social Informatics, Usability Engineering, Human Diversity in the Global Information Economy, Qualitative Research in IST) and **Software Development** (Object-Oriented Programming**, Engineering of Complex Software Systems, Gender and the Global Information Technology Sector). I am also eager to contribute new courses to the institution, perhaps Universal Usability, that bring together students from multidisciplinary backgrounds to tackle meaningful sociotechnical problems through service-learning.

References

1. Abdolrahmani, A., Easley, W., Williams, M., Branham, S.M., Hurst, A. "Embracing Errors: Examining How Context of Use Impacts Blind Individuals' Acceptance of Navigation Aid Errors." *In Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems (CHI '17)*, Denver, CO, May 6-11, 2017.
2. Abdolrahmani, A., Easley, W., Williams, M., Ronquillo, E., Branham, S.M., Chen, T., Hurst, A. "Not All Errors are Created Equal: Factors that Impact Acceptance of an Indoor Navigation Aid for the Blind." *In Extended Abstracts, ACM SIGACCESS Conference on Computers & Accessibility (ASSETS EA '16)*, Reno, NV, Oct 24-26, 2016.
3. Bishop, J. L., & Verleger, M. A. "The flipped classroom: A survey of the research." *In Proceedings of the American Society for Engineering Education Conference (ASEE '13)*, Atlanta, GA, June 23 - 26, 2013.
4. Branham, S.M., Abdolrahmani, A., Easley, W., Scheurman, M., Ronquillo, E., Hurst, A. "'Is Someone There? Do They Have a Gun?': How Visual Information About Others Can Improve Personal Safety Management for Blind Individuals." *In Proceedings of the ACM SIGACCESS Conference on Computers & Accessibility (ASSETS '17)*, Baltimore, MD, October 30 - November 1, 2017.
5. Branham, S.M., Kane, S. "The Invisible Work of Accessibility: How Blind Employees Manage Accessibility in Mixed-Ability Workplaces." *In Proceedings of the ACM SIGACCESS Conference on Computers & Accessibility (ASSETS '15)*, Lisbon, Portugal, October 26-28, 2015.
6. Buehler, E., Branham, S.M., Ali, A., Chang, J., Hofmann, M., Hurst, A., Kane, S. "Sharing is Caring: Assistive Technology Designs on Thingiverse." *In Proceedings of the ACM SIGCHI Conference on Human Factors in Computing Systems (CHI '15)*, Seoul, Korea, April 18-23, 2015.
7. Easley, W., Williams, M., Abdolrahmani, A., Galbraith, C., Branham, S.M., Hurst, A., Kane, S. "Let's Get Lost: Exploring Social Norms In Predominately Blind Environments." *In Extended Abstracts, ACM SIGCHI Conference on Human Factors in Computing Systems (CHI EA '16)*, San Jose, CA, May 7-12, 2016.
8. Faculty Development Center. "Midterm CATALyst." Accessed at: <https://fdc.umbc.edu/consultations/midterm-catalyst/> on November 26, 2017.
9. Felder, R.M. and Brent, R., 2016. *Teaching and learning STEM: A practical guide*. John Wiley & Sons.
10. Michaelsen, L.K. and Sweet, M., 2011. Team-based learning. *New directions for teaching and learning*, 2011(128), pp.41-51
11. Oh, U., Branham, S., Findlater, L., Kane, S. "Audio-Based Feedback Techniques for Teaching Touchscreen Gestures." *In Transactions on Accessible Computing (TACCESS)*, 7(3), November 2015.
12. Quitadamo, I.J., Brahler, C.J. and Crouch, G.J., 2009. Peer-led team learning: A prospective method for increasing critical thinking in undergraduate science courses. *Science Educator*, 18(1), p.29.
13. Scheurman, M., Easley, W., Abdolrahmani, A., Hurst, A., Branham, S.M. "Learning the Language: The Importance of Studying Written Directions in Designing Navigational Technologies for the Blind." *In Extended Abstracts, ACM SIGCHI Conference on Human Factors in Computer Systems (CHI EA '17)*, Denver, CO, May 6-11, 2017.