Edward Melcer Teaching Statement

While course structure and content are important factors in the efficacy of a class, teachers also play an equally vital role in the support of learning. Effective teachers engage students by asking questions in the classroom, incorporating projects that require experimentation and problem solving, encouraging peer to peer interaction though group work/study, and including a wealth of concrete real-world examples for discussion topics. Such approaches are particularly critical for applied, project oriented disciplines such as Human-Computer Interaction (HCI) and game development where it is necessary for students to be able to join large collaborative projects and contribute high quality work in their expertise. Furthermore, the teacher's approachability and accessibility both in and out of the classroom are of central importance to developing an environment that emphasizes discussion, and subsequently becomes a mutual learning experience rather than a distant monologue. This requires an important time commitment outside the classroom to meet with students who need extra assistance, as well as with exceptional students who could benefit greatly from potential research opportunities.

As a teacher at the intersection of HCI, games, and learning science, I utilize a constructivist approach to provide my students with valuable practical skills and knowledge for incorporating emerging technologies into designs, artifacts, etc. This includes an emphasis on learning-through-doing and understanding how to learn new technology and information outside of the traditional classroom setting. To that end, it is critical to create a course curriculum that merges theory, practical examples, and hands-on projects. For instance, I have applied this pedagogy when designing and teaching an upper level undergraduate course on Alternative Controllers (CMPM 179) at the University of California, Santa Cruz (UCSC). The course covered a variety of concepts such as how to utilize physical computing tools (i.e., Arduino, sensors, etc.) and augmented reality techniques (e.g., face detection, fiducial tracking, etc.) to design custom physical interfaces and controls for games. Students were introduced to a new piece of technology almost every class (e.g., an arduino, photoresistors, augmented reality techniques, etc.), and shown game trailers/gameplay videos to provide examples of how this technology has been used both successfully and unsuccessfully in alternative controller designs. Afterwards in class, they would either follow a small, guided project employing the new technology or build the new technology themselves to better understand how it works—E.g., for one class I had students create their own flex sensors using foam and conductive material (velostat) to better understand how the internal electronics of such a sensor works.

In this constructivist learning approach, basic principles of HCI and game design are taught as tools which can be utilized to critically assess existing systems and combined to build novel interactions into one's own games—rather than treating such information as a set of facts that students are expected to merely memorize for a grade. Tying theory to practice also offers three major benefits to students: 1) it develops strong fundamentals for designing and creating interactive systems through practical experience; 2) it provides concrete, interactive examples to ground and enhance understanding; and 3) it offers the flexibility to creatively experiment with course material through projects, affording a deeper understanding of underlying concepts. This approach is essential for engaging students at various skill levels and conveying how enjoyable it is to "make" and develop one's own indispensible skillset. In my Alternative Controllers class at UCSC, the effectiveness of this approach was evidenced by the course evaluation where it was noted that my teaching was "easy to understand and explained everything you needed to know" and that students "haven't felt so empowered after taking a course". Quantitative evaluations also show a similar efficacy with students giving an average score of 4.6 out of 5 for the course overall as a learning experience, 4.8 out of 5 for instructor availability and helpfulness, and 4.5 out of 5 for my overall effectiveness as a teacher.

Overall, my teaching and research interests span from HCI and learning science to introductory programming, physical computing, and game development. The breadth of my teaching positions (i.e., lecturer, tutor, and instructor) in these domains has helped me to develop and improve successful educational strategies for various aspects of the classroom. For example, as a lecturer for the UCSC Alternative Controllers course, I employed a variety of hands on methods such as in class activities designing alternative controller games using ideation decks, and creating a course Pinterest with over 100 alternative controller examples that students used for analysis and brainstorming activities to assist midterm and final project designs. This resulted in several students showcasing high quality games made during the course in a school wide game showcase (the Sammy Showcase). Additionally, my earliest teaching experience was as a Computer Science tutor at NYU Tandon's tutoring center where I worked with many students by answering questions and developing mock examinations to help them prepare for upcoming tests. This invaluable experience aided me in learning to understand and address the needs of students who struggled, and I received a tutor of the year award for the quality and dedication of my instructing. Lastly, I am also committed to the importance of diversity in STEM fields, having taught physical computing and game design concepts to underprivileged middle and high school students throughout the five New York City boroughs. This was done through extracurricular outreach programs such as a 60 hour after school Creativity in Engineering, Science, and Technology (CrEST) course and weekend Playable Fashion workshops where I taught classes ranging from 15 - 30 students.

Ultimately, I deeply enjoy teaching because of the opportunity to connect with people and share my love of HCI, games, programming, and physical computing. Each teaching setting has challenged me to expand my definition of teacher and provided me with opportunities to refine my teaching method. Moving forward, I would like to integrate ideas learned through these experiences in conjunction with student feedback to come up with more innovative strategies for teaching computer science, HCI, physical computing, and game development and design at the university level.