Kristian T. Simsarian, California College of the Arts
discovers countrywide protests on violence against women. Drawing on inquiry lessons from his Design Research course, he asks for stories on Snapchat, and in under two weeks has gathered more than 300 stories from women, and a few men, about their experience with violence. Sergio quickly prototypes a site offering advice and support, and reaches out to a Peruvian politician he met through his research. Together they discover the greater need is a site to aggregate all the existing information services.

Two years later, Sergio is a full-time designer at LinkedIn, and also working with Peruvian feminist leaders to

**Design Education Can Change the World**

It’s a beautiful day in September 2016, the first day of our new senior Interaction Design Thesis class in San Francisco. An intense discussion moves around the room, each student sharing their aspirations for the year. Our whiteboard shows two overlapping circles labeled “What’s important to you?” and “What’s important to the world?” with the intersection, labeled “thesis.”

“I have learned so much here,” says a soft-spoken young man named Sergio Burgos. “I’d like to give back by doing something for my home country, Peru.”

When Sergio starts his thesis research on Peru that week, he discovers countrywide protests on violence against women. Drawing on inquiry lessons from his Design Research course, he asks for stories on Snapchat, and in under two weeks has gathered more than 300 stories from women, and a few men, about their experience with violence. Sergio quickly prototypes a site offering advice and support, and reaches out to a Peruvian politician he met through his research. Together they discover the greater need is a site to aggregate all the existing information services.

Two years later, Sergio is a full-time designer at LinkedIn, and also working with Peruvian feminist leaders to
We knew we wanted to create something different—a potent combination of our small, socially engaged San Francisco art college and the technological design culture of Silicon Valley.
only in the issues we need to address but also in the speed with which technology is impacting society.

The industry faces increasingly complex ethical challenges in its decision making, whether over the use of personal data and machine learning, the implementation of self-driving vehicles, or the consequences of businesses built around the attention economy that, we now know, impact both our family relationships and even our democracies [1]. Advancing into the next decade with so-called exponential platforms such as robotics, machine learning, virtual reality, and blockchain will open up vast new business opportunities, displace millions of jobs, affect culture, and ultimately change policy.

Many engineering schools, including MIT and Stanford, are still debating whether technology education needs to accommodate ethical concerns [2]. But a new program at a social-justice college doesn’t have this historical burden. It seemed clear to us to ask: Just as architects help ensure the safety of buildings, shouldn’t interaction designers today help ensure the safety of technologies?

CURRICULUM: DESIGNING FROM SCRATCH

After defining our intention to humanize technology, we just needed a working definition for the discipline. In 2010 we could not find a formal definition of interaction design that could help us create the curriculum, and there were only a few exemplary studio-based interaction design programs in existence. Thus we created our own definition from the research we did on successful design programs in existence. This definition helped to distinguishly map out our new curriculum. We are not graphic designers but need some of those skills to communicate. We are not engineers, but we need enough coding knowledge to prototype and demonstrate. Our deeper skills are design for technical and social systems, and for human and machine behavior. No other traditional design discipline laid claim to that, and the definition has served us well.

“Technology changes too fast,” Bill Moggridge, IDEO cofounder and my mentor, once told me. “You need to educate students in the stuff that changes slowly—those things that are fundamentally human. Verbs, not nouns.”

We built Moggridge’s advice into the program’s learning objectives, focusing on the timeless, human-grounded verbs that underpin good interaction design such as prototyping, researching, collaborating, systems thinking, and storytelling, with a deeper understanding of core human capacities (such as those from cognitive science). Further, a recognition that technology design tools and techniques are in perpetual evolution brought focus to developing our students’ individual growth-oriented process and craft skills, such as meta-learning, reflection, creative hacking, and inquiry, thus helping enable a student’s ability to continually approach and integrate new tools and techniques (see Figure 1 for a more extensive list).

It is important to question what is. Victor Papanek’s 1973 book Design for the Real World advised readers not to accept the status quo: “Design, if it is to be ecologically responsible and socially responsive, must be revolutionary and radical.” Two generations later, with exponential technologies, democracy under threat, and climate change threatening life across the globe, the need to increase capacity through education feels even greater.

Design is about deliberate change, often of systems; a capacity to reflect is critical. In his classic 1989 book Educating the Reflective Practitioner, MIT’s Donald Schön encouraged reflective learning as a way of helping students deepen their inquiry. “The reflective practitioner allows himself to experience surprise, puzzlement, or confusion in a situation which he finds uncertain or unique,” Schön wrote.
Reflection helps us handle ambiguity and see connections. It also helps to keep us from accepting the power limitations granted by those who commission our work.

Beyond the research findings and advice, the curriculum is heavily influenced by my own path in design leadership—a humanist technical education rooted in Scandinavian cooperative design [3]—and my full-bodied design explorations pioneered at IDEO [4]. Combined together with the hard-craft-based foundation of art college, where students spend nearly all their time working with their hands, I call this whole body learning, which consists of three parts: hands, head, and heart (Figure 1).

Faculty follows curriculum. In the fall of 1984, I was an engineering freshman at Columbia in NYC. My physics class was led by a well-known physicist from the Eastern Bloc who would read aloud from a textbook in his impenetrably thick accent, deriving equations for two hours on nine blackboards, chalk splintering under his heavy hand. I gathered 80 signatures from students who agreed the course did not meet our expectations for one of the best universities in the world. The dean’s response: “He is a Nobel laureate nominee and needs to teach a course to fulfill his teaching requirement.”
Having worked in it, I now know that academia moves slowly and often has a longer-term mission. But while I understand, I never wanted to subject my students to that kind of experience. The most inspiring teachers are those with not just the experience, credibility, and energy to engage their students but also the compassion to inspire and support them.

With curriculum in hand, I just needed to find the right people with both a vibrant professional practice and a growth mindset to bring the curriculum to life—teachers who were up for taking a shared learning journey with their students. Fortunately, many of the designers defining interaction design today live within a few miles of our CCA campus in San Francisco. Through close connections to industry, our program has been able to attract and hire more than 75 design leaders as adjunct faculty since the program began in 2011, many of them with experience at Google, Facebook, Apple, IDEO, Frog, and smaller agencies and startups.

Art college as a making-based education is inherently constructivist, and nearly all courses are project based. While most potential teachers had decades of studio-based practice and industrial workshop experience, few had formal teaching experience, and in many ways, that was a better fit for our model. Educational pioneer John Dewey’s three-part experiential learning model (theory, activity, reflection) inspired how we teach our curriculum [5]. To turn an experienced workshop facilitator into an effective interaction design teacher, it often took little more than a mini-lecture on Dewey’s model and a co-creation session to identify several inquiry arcs that would create a 15-week, semester-long sequence of workshops.

CLASSROOM: HOW AND WHERE WE TEACH

At CCA, our learning and exploration take place in at least four spaces: the physical classroom, our maker’s lab, the virtual workspace, and San Francisco itself.

Art colleges and design studios have always understood the importance of a rich and stimulating physical workspace. We teach in spaces that encourage flexible, uninhibited practical work, which means movable furniture, writable walls, sticky notes, and the ever present foamcore boards for pin-ups, collaboration, and sharing. It is not uncommon to find sawdust alongside trimmed insulated wire on the studio floor.

There are few tests in art college but lots of critiques and discussion. Critical thinking is one of the most powerful, transferable disciplines of a robust art-college education. Working with a teacher, small groups of students are encouraged to talk about their own work and intentions, and explore questions and observations of other students’ work. Students also receive individual attention from their teachers each week, often benefiting directly from faculty with 20 years of professional practice in class sizes of a dozen or so. Teachers can know each student and their backgrounds, aspirations, successes, and struggles.

In this way, art college is more intimate and personal than research-based universities, attracting different learning objectives from different kinds of students. Students are largely international female people of color and include significant (over 30 percent) first-generation college attendees. Nearly all report wanting to change the world for the better and favor meaning over money. My colleague Haakon Faste often refers to his goal of creating a compassionate classroom. Indeed, teaching a growth mindset and working with complex social challenges often require individualized student support from skillful teachers in a small group setting.

In our Social Change Lab course, with the theory that nearly all the world’s important challenges can be found within a mile of campus, we use the vibrant and often challenging city of San Francisco as the classroom and design domain. In this form of service learning, students see homelessness and mental health problems firsthand. Responses include 2016’s Project Dahlia, in which three female graduate students researched, prototyped, and delivered monthly hygiene kits to women on the street and then partnered with a nonprofit to design and distribute these at scale.

Workshop: What is the material of interaction design? Each discipline in an art college has traditionally

HCI AND IxD—DISCIPLINE SIBLINGS

Human-computer interaction (HCI) and interaction design (IxD) might seem similar in practice, but they are expressed and taught in different ways. HCI programs have typically developed out of computer science departments, with a worldview that often assumes computers are central to the solution. IxD has grown out of industrial and graphic design programs, positioning human interactions as central to design practice and therefore holding digital expression more lightly.

One IxD project during my time at IDEO exemplifies this process. In 2002, Kaiser asked us to help design the UI for nurse knowledge exchange as part of its $10 billion effort to digitize medical records—something that was intended to set a pattern for a broader rollout. After studying the nurses’ work patterns over several days, we observed that critical information was lost as nurses and crews changed shifts, and that other information was often held by family members outside the official system.

Our solution was based not on the screen UI but rather in the redesign of the workflow and context. We prototyped staggered shifts so that nurses’ knowledge overlapped more effectively, put whiteboards in patients’ rooms so that families could share in the handover process, and gave nurses knowledge-capture booklets to more effectively share information when their shifts changed.

The broader rollout, instead of being an interaction pattern language, was the design and creation of the Garfield Innovation Center, an off-campus mock hospital near the Oakland headquarters built to explore and institutionalize patient-centered innovation practices throughout the Kaiser system, including a new digital innovation team.

These broader and arguably more appropriate analog responses can be developed if designers 1) are confident enough to look to the greater context, 2) see processes such as nurse-shift schedules as within their design scope, and 3) are trained in enough making-based design to create sufficiently professional analog prototypes.
The lab into a college-wide effort available to all students. The lab is devoted to interdisciplinary, collaborative curricular and extracurricular experimentation using agile technologies like Arduino. Design students create interactive environments; fashion students make wearables; fine arts students create fire-breathing robots; architects make walking buildings. It was a significant achievement to establish the practical and conceptual importance of interaction design in our college and unify multiple disciplines around the creative potential of technology.

CULTURE: SEVEN VALUES

The culture of our program is strongly influenced by every new intake of students and the natural annual turnover of faculty. While we are heavily influenced by the design-thinking movement, we also feel the need to push further beyond that label and delve into design craft.

Over the years we developed and had its own physical workshop—a place of physical tools and making. Accordingly, we were invited to build one for our program. We knew it would not be a computer lab. Defining the workshop forced a definition of the “workable material” for interaction design. After some deliberation, we defined our material to be technology, which made the workshop focus “to enable the creative workability of technology in a similar way that a ceramicist uses clay” (Figure 2).

We met this need by creating the Hybrid Lab. The lab offers generous operating hours and has large, welcoming doors and bright lights that invite students in. Curated shelves of projects, drawers of electronic parts, 3D printers, soldering stations, and helpful student assistants create an atmosphere of experimentation and exploration. The project brought together faculty from all four college divisions: architecture, fine arts, humanities and science, and design. Enthusiastic support from the president and board of trustees gave us the resources and funding to expand the lab into a college-wide effort available to all students.

The lab is devoted to interdisciplinary, collaborative curricular and extracurricular experimentation using agile technologies like Arduino. Design students create interactive environments; fashion students make wearables; fine arts students create fire-breathing robots; architects make walking buildings. It was a significant achievement to establish the practical and conceptual importance of interaction design in our college and unify multiple disciplines around the creative potential of technology.

For further information or to submit your manuscript, visit jocch.acm.org

ACM Journal on Computing and Cultural Heritage

ACM JOCCH publishes papers of significant and lasting value in all areas relating to the use of ICT in support of Cultural Heritage, seeking to combine the best of computing science with real attention to any aspect of the cultural heritage sector.

Figure 4. Danielle Forward, Sheryl Sandberg, and Annita Lucchesi at a Natives Rising gathering organized by Forward.
posted a collaborative manifesto of our shared values that provides focus, inspiration, and momentum for the playing, learning, and working we do together (Figure 3):

- **Iteratively make and learn.** Designers are makers and learners. Great designers find ways to iteratively ask the right design questions, and they iteratively respond toward the right designs.
- **Share your work.** Our practice is fundamentally collaborative. We openly share our work, seek and value integrity for our designs and others, and are confident about our contribution.
- **Push and support.** As designers, we must take risks if we are to make an impact. We are coaches to one another, pushing and supporting each other to do our best work.
- **Ask big questions.** We question the status quo and we aim high. Our questions expose opportunities for which we can be inspired and challenged to reach our collective potential.
- **Embrace optimism.** Technology is a tool, and it takes humans to guide progress. We seek bravery, hope, and connection. We inspire each other toward making the world better.
- **Work the systems.** Everything is connected. By exploring systems, we design for positive impact while minimizing harmful outcomes. When the status quo does not support our work, we seek and celebrate creative hacks.
- **Seek real impact.** We must reality test with real people. We ask the world what is most important; we show the world our design responses; and we learn, measure, and improve.

**HANDS, HEAD, AND HEART: TOWARD A MODEL OF SOCIAL CHANGE**

By designing the curriculum around a holistic approach of the hands, head, and heart, we are able to connect our practical teaching approach with our aspirational theory of social change. To effect change from within the industry, we want to give our students three things: 1) the handcraft skills to earn a seat at the table of the most impactful organizations in the world, 2) the leadership skills to develop a voice at that table, and 3) social impact skills, gained through work with the community, to bring compassion and heart to the table. If we do this right, we will increase the number of human-centered-technology-shaping designers and leaders who will increasingly help frame social challenges as design and business problems.

Annually we receive 250 international graduate applications for a few dozen spaces, and we have celebrated more than 140 graduates of our bachelor’s and master’s programs. Our graduates now work at Google, Amazon, Facebook, Airbnb, Adobe, the United Nations, nonprofits, and many other companies across the technology industry, where their knowledge and compassion will be the foundation of their professional practice for the next 40-plus years.

In 2017, design research by our BFA student Danielle Forward revealed that only a small fraction of Native Americans graduate college with a four-year degree. A northern California Pomo Native American herself, Danielle developed the site Natives Rising to support Native Americans in the tech industry through mentorships and by celebrating their achievements. In September 2018, her first mentee made a connection through Natives Rising and started work at Pandora. Now a product designer at Facebook [6], Danielle organized an internal Native American design group and brought activist Annitta Lucchesi to speak on campus in November 2018. After attending as a guest, Facebook COO Sheryl Sandberg lent her support to Lucchesi’s campaign highlighting the epidemic of missing Native American women across the U.S. (Figure 4).

Danielle’s story illustrates the kind of positive social impact we want to achieve with interaction design education. Our students graduate with expressive courage and compassion along with the skills and understanding of the full design process. It’s an education of the hands, head, and heart. And a combination that I believe can help change the world.

**ACKNOWLEDGMENTS**

I am deeply grateful to have had this unique opportunity to develop and teach these amazing students in a college with a social mission. I especially want to thank college president Steve Beale and provost Mark Breitenberg, and early collaborators: Bill Moggridge, Scott Klemmer, Terry Winograd, Tim Brown, Maria Giudice, Scott Snibbe, Haakon Faste, Marcus Gosling, Don Norman, Erik Adigard, Jason Kelly Johnson, Rachel Schreiber, Barry Katz, Nathan Shedroff, Brenda Laurel, Scott Minneman, Indhira Rojas, Joy Mountford, David Sherwin, Alexander Vikmanis, Barney Hayes, Sharon Green, Dan Saffer, and the incredible founding faculty and pioneering students of CCA IxD.

**Endnotes**


**Kristian Simsarian** is an award-winning innovator, designer, and educator who pioneered a CSCW approach to human–robot interaction in Sweden and later cofounded and led the Software Experience practice at IDEO. He is an associate professor and founding chair of the Interaction Design BFA and Master’s at CCA. His consultancy helps steward disruptive innovation for the greater good. → ksimsarian@cca.edu