

# Finding One's Way\*

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Larry Leifer and I gave a co-keynote talk on 'Finding One's Way' at the opening lunch of the Mudd Design Workshop VIII. Larry addressed a model for problem solving, whereas I focused on finding one's way as a design practitioner, teacher and researcher. My experience has been that the most successful designers have had a wide range of experiences and have created their own nontraditional pathways. My goal was to stimulate reflections from the participants about their own paths and the paths of their students. Doctoral student Lora Oehberg assisted my talk with the mind map shown in Fig. 1.

I started out in college as an anthropology student as I was interested in understanding human behavior in different cultures. I soon realized that I wanted to do more than observe; I wanted to create things as well. In transferring to mechanical engineering in the early 1970's I was shocked to find no other female students in my classes. After graduation I worked for industry for six years, then returned for a doctorate in an interdisciplinary program at Stanford University that was then called Engineering-Economic Systems. I had intended to return to industry and only interviewed for faculty positions at the insistence of my doctoral advisor Doug Wilde. I was at the right place at the right time as ASME and NSF had just issued a white paper on the importance of systems engineering in mechanical systems. I received several offers and accepted a position as an assistant professor at the University of California at Berkeley in the Department of Mechanical Engineering in 1984.

During my early academic career as a student and assistant professor I felt that I didn't really fit in. The standard formulas for success just didn't appeal to me. My interests were broad and I loved working across multiple disciplines. As I developed my own voice and confidence, along with tenure, I was able to 'find my way' by creating a design-thinking environment where my students and I could thrive.

In the keynote I summarized some lessons learned for 'finding one's way':

1. **Embed design across disciplines and curricular levels:** Good design requires utilizing methods and expertise outside of one's discipline in engineering. Find a way to create partnerships outside the college of engineering in the social

sciences, education, arts and humanities. Utilize design opportunities at all levels of the curricula: freshman to senior and at the graduate level. At UC Berkeley, we developed the Management of Technology program (engineering and business), Berkeley Institute of Design (engineering, architecture, information, art, humanities, education, social sciences), Berkeley Center for New Media (engineering, art, humanities), Engineers and Business for Sustainability (certificate program originally between engineering and business, but now expanded to all disciplines), Blum Center for Developing Regions (campus-wide program with courses on sustainable human-centered design) and the Cal Design Lab (studio space for architecture, business and engineering). UC Berkeley's Human-Centered Design Threads is an undergraduate certificate program for students in any discipline. They are required to take a shared seminar and three design courses in different departments. I also found our SESAME (Studies in Engineering Science & Mathematics Education) interdisciplinary doctoral program to be a great source of wisdom and students interested in the cognitive and educational aspects of design.

2. **Hang out with like-minded and interesting colleagues:** Design is a social activity and so is teaching design. I sought out like-minded colleagues to collaborate with on teaching, research and outreach projects. A number of serendipitous initiatives started with just hanging out with fun colleagues.
3. **Develop integrating infrastructures for students:** Lesson (1) above talks about formal structures that colleagues and I created to develop design-thinking environments with meaning on the UC Berkeley campus. To enable students to find their way, we faculty we need to encourage our students to create infrastructures that work for them as well across disciplines and levels. *Berkeley Innovation* is a student club founded in 2003 with students from disciplines across the campus. The founder was a bioengineering student in my senior design course, Menzies Chen; I continue to be the faculty sponsor. *Berkeley Innovation* works on a number of campus design projects and initiated the stu-



**Fig. 1.** Alice Agogino (left) giving keynote talk with Lora Oehberg (center) annotating with a mind map. Larry Leifer (right) looks on and later gives the second part of the keynote.

dent-run {design.} course in Fall 2009 to train and recruit potential new members of the club. The graduate students and teaching assistants in our regular classes also offer workshops and tutorials on a wide range of design thinking skills through *Berkeley Innovation* and the Berkeley Institute of Design. These student-driven informal integrating infrastructures keep our design activities fresh and provide a supply of eager young designers. More detail on lessons learned from {design.} and the Human-Centered Design Threads can be found in our paper in this special volume titled: ‘Multidisciplinary Human-Centered Design: Fostering Innovation Across Engineering, Humanities and Social Sciences’.

4. **Develop close connections with local design & engineering firms:** Design can never be solely an academic activity. Local design and engineering firms provide problems to be solved, mentoring for our students and validation of our work as design faculty. They also provide authentic feedback to our student design teams.
5. **Identify diverse entrepreneurial & intrapreneurial funding opportunities:** The UC Berkeley community has created an environment where students have a diverse range of funding sources

to pursue real world design solutions. In addition to extramural design and business competitions, the campus community has developed funding for grand challenge initiatives. For example, our students decided to add a student fee to fund The Green Initiative Fund (TGIF) to fund sustainable projects relevant to the UC Berkeley Campus. Tom Kalil, former Special Assistant to the Chancellor and Deputy Director to the White House Office of Science and Technology Policy, helped launch our Big Ideas competition to inspire students to work on innovative and high-impact student-driven projects focused on solving the world’s most urgent problems.

During the workshop participants said that my lessons learned resonated with them and several junior faculty thanked me for providing inspiration for their own way finding. A few participants shared with me mind maps of ‘their way’. I ended with a quote from my most recent doctoral graduate student and semi-professional dancer Catherine Newman. As she struggled to find her way as an undergraduate student at UC Berkeley, she created her own unique path and urged us all to follow our passion and define *engineering on our own terms*.