White Paper: Navigating Motivations to Not Learn Computer Science

Betsy DiSalvo

October 2013

Many programs seeking to increase computer science learning use personally meaningful projects or focus on digital inequalities and issues of preparatory privilege. These are important aspects of understanding motivation and access. However, they do not address the active desire for young people to distance themselves from formal education or technology identities. The objectives of this white paper are to: 1) Suggest ways to better understand how conflicting cultural values and self-beliefs can motivate young people to reject learning even when given access and opportunities to participate in personally meaningful programs. 2) Propose design practices and tools for educators and technologists to create learning environments that allow for those with motivated to not learn computer science to navigate between personally meaningful learning and conflicting cultural values and self-belief systems.

While much of the literature looks at motivation to learn, I suggest that designing learning environments that also address motivations to not learn, and ways to navigate around that will be more successful with underrepresented groups in computer science. I propose that motivation to not learn is shaped by the interplay between cultural values (Schwartz, 1999), self-beliefs (Dweck, 2000), and self-efficacy (Bandura, 1977). In the Glitch Game Testers program we observed emergent behavior for navigating around motivations to not learn.

**Motivation**

Many young people who show an aptitude for learning computing and even show an interest in learning computing chose not to persist with computer sciences (Carter, 2006; Margolis & Fisher, 2002). We have seen efforts to change these students minds, and make them see how appealing computing is by stressing computing’s impact on society, pointing out the creative a collaborative work that goes on in computing, and creating interest driven projects that allow for constructionist learning (WGBH Educational Foundation & ACM, 2009). But what if the reasons for not choosing to study computing are actually valid and well informed? What if the young women and men who chose not to study computing are making well informed choices based upon the way computing is taught and perceived in the U.S.?

I argue that we accept their reasons for rejecting computing as valid. I suggest that we are unlikely to make an impact on their beliefs that computer science is not cool, it is not collaborative, and studying computer science is generally not about “doing good” in the world. One could argue that computing is not cool to them, and more importantly it is not cool to their friends (B DiSalvo, Bruckman, Guzdial, & Mcklin, in press). There is evidence that computing is frequently not taught in collaborative and supportive environments for those who feel like others (Barker, Garvin-Doxas, & Jackson, 2002; Margolis, 2008; Margolis & Fisher, 2002). One could also see evidence that computing education is focused on developing skills for production that will improve the bottom line for companies rather than “doing good” in the world.

Even when we spark an interest in computing how can we move students with valid reasons for not studying computing to persist? I suggest we address this issue through participatory design of long-term programs that meet the values and needs of underrepresented groups, even if they are not the same values or needs of the computing field. For example, through my work with the Glitch Game Testers (B. DiSalvo et al., 2013) We found that jobs were of
great value to the low-income African American male high school students participating, but the jobs were also valued by to their parents and friends. The high value on the job aspect of Glitch allowed the participating to only tell their friends and family about this part of the program and to omit any mention of learning computer science. Yet, over 65% have gone on to study computing post high school. I suggest this long-term engagement with computing was made possible because they had an excuse or appropriate “face” to put on their involvement.

The Tech Hustle
To leverage this concept of a work environment that doubles as a learning environment I propose a Tech Hustle Co-op (THC). The THC is a technology support group and tech builders staffed by African American high school students in low-income neighborhoods of Atlanta. Beginning in 2014 students will work as independent contractors for the cooperative, sharing in the profits they make. In addition, students will spend a 2 – 5 hours each week in computer science workshops and classes. With this new organization we can collect baseline data on navigational tactics, self-beliefs, self-efficacy, and other means of disidentification with learning. Using this baseline we can study these non-learning motivations and test designs methods for learning environments that encourage students to navigate around conflicting motivations.

Translating Findings into Design Practices and Tools
Translation of theory on motivation into practice and practical tools is an important goal when dealing with such transient value systems such as what is “cool” or “uncool”. This is a critical step because applying the theory in this case, by respecting the motivations of those motivated to not learn, can conflict dramatically with what we feel as educators when confronted with students who are actively motivated to not learn. It can feel like a personal insult when students reject the learning opportunities we give them. Designing tools that help educators and technologists understand and design for cultural differences can assist in overcoming our own biases about motivation and learning. To do this, I seek to develop design practices and tools for educators and learning leaders to help create environments for negotiating conflicting motivations. There are five sets of artifacts that I anticipate these practices and tools will take.

Instruments that assist educators in understanding conflicting cultural values and self-belief systems.
Through the development and use of data collection activities for studying face saving, self-theories, and self-efficacy, I will seek to refine and cull the aspects of those instruments that are most useful in understanding a small classroom or community group. I will then apply these tools with small groups in the TSY and other community groups to help refine them for functionality with other teachers and community leaders. The goal will be to produce a functional activity, survey or focus group protocol that provides indications of where cultural values conflict with learning goals in a formal or informal setting.

Methods for constructing learning environments that have multiple purposes to encourage various justifications for participation.
Drawing from participatory design methods, I will develop activities including design charrettes, speculative design activities, and cultural probes that allow for co-design of learning interventions with students, parents or other community members. These methods will be developed to create a practical application of the four design principles outlined in 4.1.1.
**Generative interventions that allow for changes of self-belief**
Successful interventions for addressing stereotype threat have included a large amount of peer mentoring and advisement about the phenomena. In Glitch, we observed that role models significantly impacted the students’ idea of someone capable of succeeding in computer science. We will build upon these approaches by creating generative activities designed for senior participants to engage in activities that help change the self-beliefs of newer participants. These types of interventions need to be subtle and “stealthy” (Yeager and Walton 2011), and affordances for co-design and customization of the intervention should be incorporated.

**Address emergent motivations for non-learning through design.**
I anticipate that other motivations for non-learning will appear, and I seek to dedicate a part of this effort to identifying and designing for these motivations. The tools or practices necessary to confront these motivations may be addressed alongside other issues in the previous steps, but it is important to leave room for emergent needs in the study.

**Activities that help educators and partners in embracing and implementing design strategies for working with non-learners.**
Challenges for educators come from not understanding the motivations of the young people we work with. A significant challenge may be in increasing our respect, and the respect of other educators, volunteers and partners, for the motivations behind a non-learner's actions. I propose, as part of the design process, a set of short activities that could be used to help educators understand and respect those choices.

**References**
Dweck, C.S. (2000). *Self-theories: Their role in motivation, personality, and development:* Psychology Pr.
Association for Computing Machinery (ACM).