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In reflecting on my experiences throughout EDUC 94SI, Technology for Learners, I am reminded of our journey of technological progression, both in the content of our studies and in the environments in which we were immersed. Commencing in the traditional confines of a Cubberley classroom, we engaged in a deconstructive investigation of technology, considering its etymology and assessing the technical aspects of pencil, paper, and even sticks. With a change of venue to the technologically advanced space of Wallenberg Hall, our focus shifted to the past, present, and future of educational technology, contemplating and discussing applications ranging from B. F. Skinner's Teaching Machines, to rich video environments and visualizations, games and toys, immersive and virtual worlds, and boundary defying mobile technologies. Ironically, the critical consideration with respect to each of these exemplars, lies in the human domain: the learners for which these technologies have been created. As such, it is incumbent on me, as an emergent designer of technology for education, to consider who these learners are, what they are intended to learn, and the processes by which learning occurs.

The view of educational technology as the product of a design process underscores the necessity of identifying and understanding the target audience. A cursory glance at the modern state of education, in which the boundaries between traditional classrooms and informal personal and community spaces continue to soften, demonstrates that people learn in multiple ways in myriad contexts. Furthermore, these learners do not exhibit uniform characteristics as might be suggested by a traditional psychology textbook. Rather, they embody unique characteristics of culture, which must be taken into account while determining the appropriateness of technology

for their education. One critical consideration is the “digital divide” in access to and use of technologies between privileged members of society and those of lower socioeconomic status. Poor youth (Eamon, 2004), foster children (Finn, Kerman, & LeCornec, 2004), and ethnic minorities (Alvarez, 2003) are much less likely to have access to a computer at home, and tend to engage in less use of information technology when they do (Fairlie, 2002). Although this certainly speaks to the need for providing increased access to technology in educational settings, an understanding of the potentially limited experience of student populations is an important component of educational design. Furthermore, the appropriateness of the content and form of the learning technology for a particular student can determine whether it serves as a structural impediment to learning, or as an artifact that may be well-integrated with personal identity. This is exemplified in a comparison of the qualitative versus quantitative results of Baker and White's GIS Project-Based-Learning study. Although the introduction of interactive, computerized mapping systems was shown to increase academic performance in comparison to the paper-based control group, female students in the target group did not display enhanced self-efficacy or attitudes toward science and technology (Baker & White, 2003). The researchers note that female attitudes toward science are difficult to change, but consideration of documented female responses to technology should also be accounted for. Caroline Parker, in her review of the state of educational technology suggests the existence of distinct value systems across gender lines that are not accounted for in educational technology. She suggests that girls, rather than holding conscious aversions to science and technology, tend to engage in more subtle ethical assessments of technology and its use in the midst of the educational experience (Parker, 2008). Although claims of this nature merit further research, the distinct reactions to educational technology

across gender lines, as exhibited in Baker and White's study, demonstrate the necessity of accounting for the characteristics of the target audience when considering the development and application of technology for learning.

Coupled with the consideration of the identity of the learner, is an understanding of what they should learn. Although the majority of the content will be constrained by institutional mandates, at least in traditional settings, the form of the technology is equally important in the learning process. One critical goal of educational technology that is addressed via form, is that of technical literacy, which is generally defined as the expertise that a learner gains through the use of digital tools. This form of literacy has been identified as the modern standard in the evolution of literacy in the United States, and around the world, as a function of the demands of society (Rogoff, 2003). With the continual integration of interactive technology into all facets of life, particularly the workplace, a cultural premium has been placed on the ability to embody the 21<sup>st</sup> Century Skills of collaboration, communication, and creativity. These attributes may be embedded into the design of educational technology for the current generation<sup>1</sup> regardless of content, as demonstrated in Carly Shuler's review of successful learning environments predicated on mobile technologies. Both the MILLEE project, which provides extracurricular opportunities for English language learning in India, and the Kent State GeoHistorian Project, which supports student recordings of personal history, utilize similar technologies to achieve distinct goals (Shuler, 2009). Furthermore, the use of mobile technology to interact with information, and the world at large, concurrently develops technical fluency and potential for success in the 21<sup>st</sup> century.

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1 This argument only applies to the current generation as society in the future may value or require different skills.

The final question with regard to developing educational technology is how people learn, which harkens back to the discussion of learner identity. Numerous cross-cultural studies have demonstrated that people think and process information in remarkably different ways, even with regard to primary cognitive functions like attention and categorization. Nonetheless, we may still draw on a rich history of technologies for education to glean core principles that contribute to learning. This process may be applied even to technologies that appear outdated, such as B.F. Skinner's Teaching Machine, by understanding the identity of the learners and the objectives of education at the time. By recognizing and divorcing the fact that pedagogy in the mid-twentieth century was shaped significantly by the social valuation of industrialization and even military readiness, we can see that one way in which people learn is in the presence of rapid feedback, without which, relationships between cause and effect are difficult to ascertain. These lessons from the past must be incorporated with visions of the future to develop learning technologies for emerging generations. Again, Shuler's review of mobile technologies for education contains a key message, as expressed by Elliot Soloway, "The kids these days are not digital kids. The digital kids were in the '90s. The kids today are mobile, and there's a difference. Digital is the old way of thinking, mobile is the new way." Although technology is the focus of this statement, Shuler hints at a broader consideration of how people think, and, consequently, how they learn. Learners of today exist in a networked world that even someone with my technical background can struggle to comprehend, given my digital '90s purview. The documented success of current mobile learning environments suggest, then, that people learn when the learning environment resonates with their worldview, and contributes to their emerging sense of self.

The lessons discussed above carry significant meaning for me in my development in the Learning, Design, and Technology program. Early in the quarter, I distinctly recall defining the goal of my studies to be the development of technologies for learning environments. Now, my focus has shifted to the development of technologies for learners (appropriating from the course title). My experiences in this and other courses have reminded me of the human element in learning and technology, and that technologies themselves do not represent static materials providing access to objective knowledge. Rather, they serve as cultural artifacts that mediate between learner, designer, and society at large. Accounting for learner identity, goals of learning with respect to both content and form, and my personal cultural views and beliefs is critical to developing educational technologies that provide meaningful and effective opportunities for learning and growth.

## References

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