

**Redefining Equity:  
Meaningful Uses of Technology  
in Learning Environments**  
Position Paper on Equity and Educational Technologies

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## **Introduction**

Digital technologies are a potential tool for transforming how we go about learning in deeply meaningful ways. For this reason, it is important that all learners have equal access to these tools. Equitable access is necessary but not sufficient in of itself to ensure comparable benefits from using digital technologies. Therefore, any socially responsible understanding of the role of technology in learning must exceed this limited notion of access to include meaningful use of technology in the learning process. Our discussion with regards to digital technologies requires a refinement of the term equity. Generally, from the perspective of those working to bridge the Digital Divide, equity implies fair access to and operational knowledge of technology. The Digital Divide is a manifestation of social inequities which results in limited or denied access to digital resources. Tackling the problems of limited availability of technology is obviously a necessary and important factor in reducing the Digital Divide. Physical access is a prerequisite to any hope of meaningful use, so we first examine factors that inhibit such access. Focusing an equity lens on educational technologies, leads us to question whether equal access to educational technologies,<sup>1</sup> in of itself, will benefit all learners.

A broader definition of equity reaches beyond physical access to technology to include meaningful use of these tools by learners. Meaningful use describes a learner who is not a passive consumer of technology but an active user, designing, creating, and sharing content that is culturally relevant and representative of their views and values. This outcome occurs when the user engages and uses technology as an expressive tool employed to realize some relevant goal. Meaningful use embodies at least three aspects: the learner's motivation to produce content that is personally meaningful to them, activities that motivate the user to explore new ways of expression through the

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<sup>1</sup> Educational technologies are defined as a particular approach to achieving the ends of education through use of computer and other technologies <sup>[1]</sup>.

technology, and incorporation of the support systems for the student within their learning environment. This paper examines this expanded notion of equity, what factors inhibit equitable use of digital technologies, and how equitable usage impacts learning environments.

### **The Role of Community in Learning**

Constructionist learning theory holds that children learn most effectively through the active design and development of projects meaningful to them and the community around them. Through this process of creating artifacts for sharing with the larger community, they actively construct new knowledge and become more deeply involved in their learning process [3, 4, 5, 6]. In this context, technology becomes an expressive tool for the learner to convey their ideas and interests. A supportive community plays an important role in this learning process, where the learner finds herself engaged in an iterative cycle of design and reflection, further feeding the growth of their knowledge base [7].

The learner must be well served from within a community-based environment, capable of supporting the learner in a context that is adaptable to their needs. A closer look at this synergistic exchange will highlight the types of communities that best facilitate and sustain equity as we have defined it.

### **Learning Environments: A Closer Look**

The classroom is often a primary access portal to educational technology for underserved youth. Schools struggle with many challenges, including underutilization of available technologies, outdated equipment in the face of rapidly changing technologies, failure of educators and technology developers to address the diversity of learners, and the resistance of many schools to making policy and procedural changes that would facilitate more appropriate uses of technology [8]. Furthermore, access varies greatly from school to school, due primarily to disparate funding among rich and poor school districts. These obstacles are particularly prevalent for underserved populations, where available resources per student range from extremely limited to non-existent. Often, alternative or supplemental educational programs offer opportunities for underserved youth unavailable in their school system.

A less tangible obstacle to equity in learning environments centers on misconceptions about how particular groups make use of technology. The stereotypes of girls and minorities proclaim these groups possess an aversion to programming, due to what is perceived by others as a lack of interest in math, science, and mechanics. This reinforces the ideas that these groups do not view technology as an object of study or tool for producing content, but instead solely as a source of entertainment, email, and other consumer-based purposes. As a

result, these groups are often not encouraged or supported in using digital technologies beyond the simple operation of application software. Additionally, within these groups there are self-imposed barriers to deeper engagement of technology, provoked by low-self esteem, ignorance, cultural demands, or stereotypes. There needs to be places where these groups can immerse themselves in projects that make use of these digital tools.

## **Community Technology Centers**

Community Technology Center (CTC) provides public access to technology and online content. Many community technology centers offer a range of services from technical training to entertainment. Often, they also serve as an important link to educational technologies. Generally, CTCs view access as a means to educational, social, and other opportunities for its members [2, 8]. However, access alone is not enough. The challenge is to ensure the CTC provides access to technology and structures to support creative and constructive learning opportunities. A carefully configured CTC is fertile ground for seeding and cultivating the type of community that supports learning. The Computer Clubhouse, a specialized CTC, serves as a model for how technology centers can provide its members with equitable use of educational technologies in a culture where learning occurs naturally.

## **The Computer Clubhouse Model**

The Computer Clubhouse is an after-school CTC where underserved youth come to explore their own interests, become confident learners, developing technological fluency in the process [6]. Making use of high-end design tools, such as 3D editors, graphic design and music editing software, movie production resources, and other tools, members work on extended projects related to their personal interest and experiences. The Clubhouse has evolved a vibrant community of members and mentors who share the space, provide mutual support and encouragement when requested, and pursue their own projects.

A Clubhouse member, whom we'll call Jay<sup>2</sup>, is an African-American high-school student, three-year Clubhouse veteran and has become the resident expert in advanced 3D modeling and animation software used by professional architects and animators. He is also the designer of the new Computer Clubhouse logo. When asked how he has benefited from membership at the Clubhouse, Jay responds, "I definitely want to go to college, a regular college where I can focus on computers and get other essentials. If I hadn't come to the Clubhouse, I'd be pretty bored. I'd be staying at home, watching TV. That would be my whole day."

Members like Jay become resident experts, in his case designing projects utilizing 3D modeling software, providing a knowledge source to other community members who

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<sup>2</sup> For confidentiality reasons, names are fictitious.

need support using these design tools. This highlights a special feature of Clubhouse culture. Within the Clubhouse, there is fluidity between the roles of mentor and learner. In fact, role switching is a commonplace occurrence, fueling the learning experience through a cycle of learning by doing and learning by reflection. Learning by doing is embodied in the design process. Learning by reflection occurs via a process of teaching others a newly acquired skill and discussion of their project and its development. These dynamics are difficult to negotiate in formal educational settings. At the Computer Clubhouse, learners enter a culture that empowers them to control what they learn and how deeply they delve into any particular subject, leading to learning opportunities situated in their experiences inside and outside the Clubhouse community. The result is a Clubhouse full of bright, eager learners expressing themselves and disseminating their unique viewpoints through meaningful use of digital technologies.

### **Ensuring Equity**

The Computer Clubhouse is part of a larger social community of local neighborhoods. Inequities within society inevitably seep into the Clubhouse environment, regardless of how careful the environment design. The Clubhouse model's responsiveness to community needs allow for quick remedies to perceived barriers to equity. For example, about five years ago at the Flagship Clubhouse it was noted that many girl members were not taking full advantage of the space. Girls would typically take a subordinate role to boys in the competition for design tools and other resources. Feeding this dynamic were the old stereotypes girls were battling of not being techno-savvy. This led to frustration on their part and significantly lower retention levels for girls than for boys. The Clubhouse addressed this issue by instituting Girl's Day, which is a Clubhouse day set aside for girls only, allowing them unfettered access to Clubhouse resources and female mentors.

A fifteen-year old Girl's Day member, whom we'll call Amy, takes hour-long train rides to get to the Clubhouse after school. Amy especially likes coming on Girl's Day because, she says, "no guys are allowed" and revels in the support of female mentors and staff. She has produced numerous projects, including artwork, movies, and a weather balloon science experiment. Girl's Day has become an important part of the Computer Clubhouse culture and has aided the retention of girl members by providing a supportive environment where they can stretch their wings, constructing projects using technologies not traditionally portrayed as girl-friendly. The Clubhouse's response to this community need demonstrates the flexibility of this specialized CTC model.

Because of its phenomenal success as an informal learning environment that addresses issues of equity and learning technologies, the Computer Clubhouse Network has won the Peter Drucker award for Non-Profit Innovation and, with support from the Intel Corporation, is expanding by another one hundred Clubhouses worldwide over the next three years.

## **Recommendations**

The goal of this paper is to foster discussion and awareness of inequities in learning environments as they relate to digital technologies. Possible future directions to examine include:

- Emulation of successful CTC models, like the Computer Clubhouse, with records of accomplishment in providing equitable access to educational technologies.
- Design of more CTC activities modeled on constructionist principles. Critically review technology applications. Discourage the use of technologies that do not challenge learners to express their ideas and leverage their knowledge.
- Work towards developing constructionist CTCs in communities that have no such resources. This provides alternatives to the limited school resources, in many cases serving as the only reasonable source of access to educational technologies.
- Become active in promoting the idea of specialized CTCs as viable learning environments which complement traditional public education.
- Direct students to supplemental resources, like the Computer Clubhouse, that are available in their communities.
- Continue developing measures and methods for ensuring CTCs remain flexible and sensitive to the needs of their communities. Self-monitoring to readily identify and address inequities.

## **Conclusion**

Our hope is to stimulate further discussion and reflection around the promotion of equitable uses of technologies in learning environments. The Computer Clubhouse CTC model embodies commitment to a fuller notion of equity, by providing access to educational technologies for its members and opportunities for constructive, meaningful uses. The model is flexible enough to remain sustainable in the face of adjustments necessary to address existing barriers to equity. We must continue pursuing opportunities for meaningful uses of technologies particularly suited to constructionist learning and adaptable to a variety of learning styles. We must converge on a precise definition of equity in the context of digital technologies. Access to and meaningful uses of digital technologies will empower users to realize their potential as good learners and producers of content.

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