

Digital learning and play: A synthesis and elaboration from a CILS Bay Area Institute Roundtable

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I. Background

In August 2005, a two-part discussion among scholars, education researchers, graduate students, museum professionals, evaluation experts, and educators took place at the Center for Informal Learning and Schools (CILS) annual meeting, the Bay Area Institute. This roundtable's goal was to advance conversation among researchers and practitioners interested in examining informal learning and play in settings that are mediated by digital-based technologies (e.g., personal digital assistants, mobile phones, laptops, videogame systems). The discussion was intended to generate synergies and collaborations for concurrent investigation of ethnographic and design-based studies to better understand learning, motivation, and play in digital environments among youth and young adults. The following is a synthesis, elaboration, and summary of the discussions that took place over the two days.

II. Key issues in digital learning and play

If you observe what children, teens, and young adults choose to do with their leisure time, some of these activities involve individual uses of technology, but the predominant forms of use are social, taking place within the context of electronic, Internet-based, and/or digital technologies. These include watching television, browsing the Internet, sending messages on cell phones, exchanging digital songs, writing personal online diaries, chatting with friends on the Internet, playing video game boxes, and consuming digital media in various forms. This attraction to and engagement with electronic media and tools isn't just limited to children's leisure hours; it occurs when they're at community centers and museums too. Museum practitioners report that youth in museums are hunting down computer-based exhibits/kiosks, which have better holding time than traditional object-based exhibits.

Many youth today have grown up in a digital world in which their preferred form of engagement and entertainment is mediated by technology, and the predominant form of out-of-school learning is by navigation of digital information and online spaces. Anecdotes of youth falling asleep with mobile phones under their pillows or playing massive multiplayer online role playing games like *World War Craft* for dozens of hours a week for months at a time are examples of these social practices in which youth are always "on" and "connected" with their peers because digital technology is mixed into the context of everyday activity and routines. This phenomena of digitally connected youth is not only taking place in the U.S. but internationally, driven by ubiquitous access to mobile phones and the Internet and the rapid scientific and technological advances that continue to increase the communication, computational, and storage capacity of portable networked computing devices at lower costs and lower power requirements. For example, in several cases, the citizens of other countries have more deeply adopted and integrated mobile phones into their everyday lives (cf. Katz & Aakhus, 2002) and \$100 laptops are being distributed to children in multiple countries (MIT, 2005). Our accounts of youth learning and development need to take this global trend into account.

Youth are using the tools that are immediately available to them and, in many cases, customizing and adapting them to their own use, displaying fluencies in using information and new media technologies (Lenhart & Madden, 2005; Lenhart *et al.*, 2005). Unlike prior computer-based programs or electronic media, digital technologies are networked, connecting peers to each other, and "open," allowing content to be authored and digital annotations and inscriptions to be made. Researchers and practitioners alike report that youth are adapting media and creating their own cultures, taking their favorite stories and rewriting them in online communities (Jenkins, 2004; Ito, 2005). Viewed as a form of cultural production, youth are establishing their own set of norms, social relationships, and practices, working and playing in online play spaces, "hacking" computer programs, creating custom modifications ("mods"), and personalizing digital environments for their own purposes.

In a relatively widespread form of this digital social interaction, young adults critique and contribute sources of digital information based on a system of social reputations rather than from a single authoritative source. For example, in Google™ news, multiple views on the same story can be collected and ranked based on how often they are being read. In Friendster.com, WhyVille.net, and Wikipedia.com, members of online communities jointly produce knowledge for its community members as well as verify the sources of information that are posted. Another example of this practice is ethnographic research on the technological fluencies of undergraduate engineers carried out by Bell and Zimmerman (in preparation), documenting similar online community social norms. These undergraduates have established sets of “blogs” used to share various kinds of information associated to their technological activities. The distributed, informal learning community routinely grows an information database of ‘hard won’ technology knowledge through a shared social expectation that individuals systematically contribute newly created information whether or not it has been explicitly requested by others (Bell, 2005).

The knowledge, skills, and practices that are developed during digital play are often questioned as a legitimate form of literacy, and in some cases, viewed as a competing and detrimental force in school performance, career development, and productive life. As these interactions and activities take a central role in the lives of youth, educators, teachers, parents, schools, and education policy makers are also paying serious attention to how youth’s play activities with digital technologies might interfere with schooling, pose challenges for teacher professional development, and/or contribute to traditional forms of literacy. New questions emerge:

- What does research say about the nature of play and learning in these digital environments and the impact this might be having upon youth, young adults, and their schooling?
- How are these technologies changing the cultural and geographic boundaries of children?
- What happens when feedback is quickly provided to a learner?
- Where does the material world and hands-on experiences fit into an experience when the preferred mode of engagement is in a virtual environment without physical objects and the affordances of physicality?
- How have researchers and practitioners tried to understand participation and learning in digital play?
- Should learning experiences in informal learning environments (e.g., science centers) be augmented by having learners make coordinated use of digital devices? What fluencies with digital technologies can be presumed among museum goers (e.g., information search strategies)?

These and other new questions are emerging from research in out-of-school settings and research in the interdisciplinary learning sciences aimed at understanding the relationships between informal learning, digital play, and formal schooling.

III. The current state of knowledge and practice

Several studies have been conducted that include survey studies and literature reviews, one which was based upon a project funded by the MacArthur and Kaiser Family Foundations on digital-mediated learning by youth (see Lyman et al., 2004; The Children’s Partnership, 2005; Kaiser Family Foundation, 2005). The Pew Internet Studies on teen’s use of the Internet as well as statistics gathered by National Center for Educational Statistics confirm the engagement of children online, examining student’s television watching, Internet use, and performance in school (Roberts, Foehr, Rideout, 2005; Lenhard, 2005; NCE, 2003). The technology fluencies that youth are developing with digital technology has also captured the attention of the U.S. National Academy’s Board on Science Education, who recently convened a panel in October of 2005 to address the issues surrounding the role of technology fluency in high school curricula or out-of-school activities (see <http://www7.nationalacademies.org/bose/> for details). In addition, researchers and test-beds located around the world are coordinating efforts to examine digital learning and digital-mediated experiences (see <http://www.g1to1.org/>).

To understand digital learning and play, it will be important to recognize the various multiple and different perspective available to study the interactions and activities taking place in these environments. One perspective is to conceptualize the actions of youth as play (see Robin Meisner, CILS PhD dissertation), examining the characteristics and types of play (Hutt, 1973) and the agency, intentionality, and seriousness that young adults take on play-like activity (aka “deep play”) (Geertz, 1973). While children are playing, they are also developing competencies in goal-oriented tasks like online games or simulations, and appear to practice and rehearse decision-making and important life skills.

Prior research on studying child development and the prevailing social practices as children form new cultural worlds and systems of activity could also contribute to understanding youth development in digital learning environments (see Nesper, Kyratzis). This perspective specifically helps us understand the cultural worlds and practices that children and youth constitute and manage for their own purposes. The aforementioned 'play' image is consonant with this image of technology-mediated, self-constituted culture. It is an alternative to some views of technological fluency that presume that youth should only or primarily be socialized into the established technological practices of adults (e.g., skills associated with workplace competence). An increasing number of studies help confirm the perspective that the new technologies serve an important developmental function in the formation of youth microcultures (e.g., specialized online communities [Egan, 2000] or mobile phone practices [Ito, 2004; Kasesniemi & Rautiainen, 2002] that first and foremost serve the interests and needs of youth).

Another more common perspective is an examination of the technology fluency and 21st century skills, examining what problem-solving skills and interpersonal team-based skills are learned and how these will contribute to preparing youth for the future scientific and technological workforce. In some cases, these fluencies are broken down into specific competencies and benchmarks to assess technology literacy and skills.

In cognitive studies of digital literacy, the specific representations and annotations of those representations that learners create and their reasoning behind them are also examined (cf. diSessa). Given that many of these online and digital-based youth activities take place among peers and groups, socio-cultural researchers that draw upon activity theory and theories of distributed cognition examine the collaborative practices that take place in digital environments. (cf. Hutchins, Pea, Koschmann). Overlapping in this tradition is to specifically examine the social exchanges, intent participation, discourse, "repertoires of practice" and language development within the online medium (cf. Rogoff, Gutiérrez).

Digital play has also been associated with opportunities for identity formation activities – the exploration of alternative identities, gender identity, and youth identity development (cf. Turkle, 1999). With the open system architecture of new video games, personal expression, invention of new identities (e.g., avatars, names, costumes, play objects, worlds) are possible.

Because online environments collapse the physical boundaries in which informal learning and interaction can occur, one lens to view activity is the new cultural geographies defined by children's shifted negotiations of space and time (Green, 2002; Holloway & Valentine, 2000). They can remain in close 'contact' with far-flung others, or stay in nearly perpetual contact with close friends in unprecedented ways (Ito, 2004).

In summary, many different approaches exist drawn from anthropology, sociology, user experience design, museum-based research, psychology, and other social sciences for examining the activity, play, and informal learning that may take place in digital learning environments. At the same time, nascent methods are emerging from information and computer sciences that make use of web, networked, and media tools to assess learning and activity.

IV. Where do we want to go? An agenda for research and practice

Ethnographic work across different populations, different technologies, and for different purposes

An opportunity exists to both draw upon prior research and a wealth of theoretical perspectives to study informal learning especially in the context of interest-driven activities of youth in digital play spaces and an examination of students' activity across settings that youth roam from school to out-of-school, and in homes. Digital technologies like a PDA or cell phone are typically not used as a standalone device using in one setting, but in a system and coupling of different technologies across different settings. Thus, to understand the motivation, engagement, and naturalistic activities of youth, it will be important for future research to focus upon ethnographic studies of youth using different technologies and across different populations beyond the middle classes that already own and use digital technologies at school and at home. In addition, it will be important to study technology as a tool used for different purposes such as tools for living, communicating, participating in a community, or learning about yourself, beyond an educational tool for learning school subjects or learning about museum exhibitions. This deliberate synthesis from ethnographic work that can share what each of us learns across different cultural practices (e.g., information foraging, online communities, mobile phone cultures, media design) will be an important precursor before formal design experiments can begin in partnership with practitioners working in technology-rich settings. This type of research aggregation and synthesis activity could be initiated as a joint research workshop

between the Center for Informal Learning and Schools (CILS, <http://www.exploratorium.edu/cils>) and the Center for Learning in Informal and Formal Environments (LIFE, <http://life-slc.org/>), Center for the Assessment and Evaluation of Student Learning (CAESL, <http://www.caesl.org>) and other researchers interested in investigating online assessment of learning, digital learning, and play to work together.

Collaborative targeted design studies on youth

Given that some ethnographic studies have already begun in this area (see Lyman; Bell & Zimmerman, in preparation), the next step would be to examine and plan synergistic, targeted design studies based upon the ethnographic work or plan design studies that involve the examination of the digital media, digital stories, and other multimedia expressions that youth create and communicate to others. Rather than study emergent behavior only, future research would focus upon study of instructionally-design activities or highly crafted experiences and opportunities to use digital technologies that are provided to youth to examine local customization, personalization, knowledge accessibility, equity, ownership, media fluency, and other facets. Early design studies could look like design-based ethnographies that engage youth audiences in participatory design activities enlisting youth as ethnographers in their own design process (see Blomberg).

Aggregation of research methods

Given that the collection of different methods share strengths and weaknesses, there is an opportunities for synergy, especially aggregating studies across study centers, test beds, laboratories for children and technology. Web-based methods to capture online behaviors in the background as well as engaging youth as informants in their own thought processes are two examples. An opportunity also exists to conduct research that looks at the flow between in school time and out of school time and the nature of personalization and customization of digital technologies, especially when digital information, cell phones, email, and other online information that supports the social worlds of kids bridges activity in the classroom and activity out-side outdoors the classroom.

Address and innovate upon human subject issues

One issue that will need attention is working through issues with institutional review boards for human subjects for minors. For example, research that falls outside of school time in which children's online behaviors and activities are captured, or youth are asked to be self-documenting their activities by writing in online diaries and photographing their parents, siblings, and home life poses new challenges. Children become informants not only of their own activity and educational practice, but as informants of others and other aspects of family life creating issues of risk, ethics, and privacy. Research in online contexts or in learning contexts that crosses institutional boundaries (e.g., mobile cell phone use, Internet accounts, cyber assessments) that govern different norms for the protection of human subjects will need to be addressed. Some promising examples of camera-based multimedia studies and playing in public spaces that have passed institutional review boards do exist which is promising (cf. Philip Bell at Univ. of Washington, Coeleta Stafford at UC Berkeley).

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