CREATING EQUITY SPACES FOR DIGITALLY FLUENT KIDS

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Digital tools provide youth with powerful ways to extend their worlds and to enhance their capabilities in interacting with them. In a review of recent literature on youths' engagement of digital tools, Lyman (2004) suggests that there are three main opportunities in the general domain of digital tool use by youth – communication, imagination, and cultural production among digital kids. Dr. Lyman also identified a key barrier: the digital divide.

The digital divide has been addressed from an educational policy, technology infrastructure, and access issue, rather than a focus on the learner and supporting learning through enacted imagination. Our core hypothesis is that every child will be creators, producers, and generators of imagination if provided with equitable access to digital media, human instructional resources, and technologies to develop digital fluency[1]. This paper focuses attention upon uncovering how emerging tools might provide all youth with new chances to express themselves and how youth can use print and media rich elements to create new ideas, new projects, and new kinds of activities with peers and siblings (see Cheskin 2002 report). We identify the major opportunities for supporting digital fluency, and how these opportunities can be made available to youth that represent a diversity in both their initial level of digital fluency and interest in using digital tools, regardless of their ethnicity/race, class, and current social status.

Tool Focus and Design Research

The methodology embraced in this project is that of design research (see Laurel, 2003), and its fundamental focus is on the "tool" side of the socio-technical systems described Woolsey and Lyman and Ito (see Digital Fragments & other reports). It is very deliberately aimed at a description of a large number of digital tools that exist today (cell phones, the web, software packages), and in the articulation of how these might be combined and extended to allow students to engage their imaginations and build their digital fluencies. Complementing the ethnographic analyses of emergent behaviors of Lyman and Ito, the focus is shifted to the "emergent tools" that can extend these behaviors --- over a range of different content domains from "school subjects" like science and history, to hobbies like music or sketching and a range of media types (e.g., online text, graphics, digital movies, animations, digital radio). This design process is both iterative and formative. As new designs are developed for youth and used with youth, the tools are themselves refined and transformed, and then reintroduced to the next group of youth, and so on in a virtuous cycle shown below.

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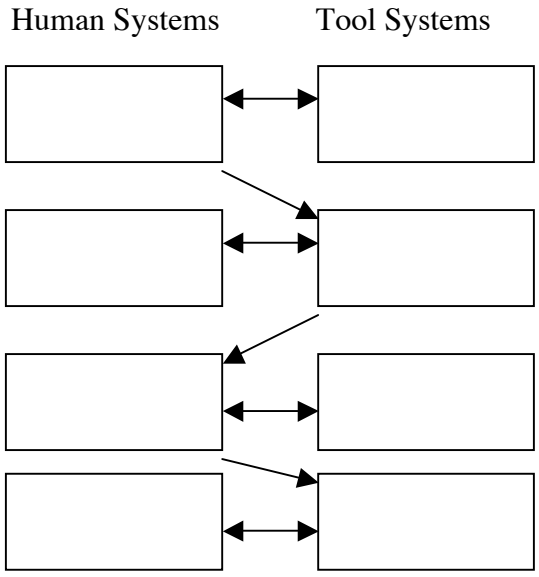
[1] Digital fluency is loosely defined as the competencies, new representational practices, design sensibilities, and technical expertise that a learner gains or demonstrates by using digital tools to gather, design, evaluate, critique, synthesize, and develop digital media artifacts, communication messages, or other electronic expressions.



In this sense, we intentionally focus our primary endeavor upon working with youth to invent contexts and challenges that can "flex their imaginations" in the digital domain. While the project begins with an identification of promising digital tools, and the spontaneous use of these tools, its core activity is upon the design of new activities, and the identification or design of new tools to enable kids to be producers and designers themselves, which encourage more deliberate use of these tools and their imaginative combination.

Why Imagination is the Goal

Einstein is credited with the remark that "imagination is more powerful than knowledge". Knowledge is surely powerful and important, but here we see one of the most intelligent people of the 20th century suggesting that imagination might be even more critical.

Unfortunately, even though many very accomplished professionals emphasize the centrality of imagination in great contributions, schools are remarkably resistant to acknowledging its importance. If applauded at all, imagination is considered as important in the arts, or as something that might be important "after you know everything". And so though all children seem to begin their lives with active curiosities and imagination, their schools lives do not typically develop these capabilities and often interfere with them.

In recent years, we have seen youth's imaginations invigorated with the advent of digital technologies. They have embraced these often radical new tools, and incorporated them into their daily lives. They have essentially defined the conventions of instant messaging systems, inventing new forms of syntax and mastering the ability to communicate with many people at once in the silence of their bedrooms at night. They have energized the

development of music downloading businesses, and they have filled "wikis" and "blogs" with their views on the world. They have extended their own imaginations in their engagement of digital technologies, and they have contributed to the development of these new media forms with their imaginative activities.

Addressing the New Digital Divide

Unfortunately, the opportunities to engage digital technologies are not available to all youth (Lenhart, Lee, Lewis, Oliver, 2001; Pew, 2002; Roberts et al., 2002). Though there are a substantial number of upper middle class white kids who have computers and digital cameras and picture cell phones at home, these tools have not found their way to all youth, and so the generative imaginative capabilities of these tools are unavailable to many. A consequence of this growing divide is that middle and upper middle class youth are defining the mainstream uses of digital technologies, and market driven forces will respond by catering to this narrow audience.

There are a large number of other out-of-school settings that might offer opportunities to explore imagination and the imaginative opportunities of digital technologies. Public libraries, museums, community organizations, and after school centers are becoming important elements of the learning ecologies which we can think of surrounding all youth. Schools will unlikely emphasize imagination in the near future, nor will they incorporate digital technologies. However these other learning environments provide us with excellent opportunities to investigate youth's spontaneous imagination and to cultivate tools and situations that encourage its development.

Roadmap for Design Research

To investigate learning through enacted imaginations, the following working hypothesis drives our research agenda:

Every kid will be creators, producers, and generators of imagination if provided with equitable access to digital media, resources, and technologies to develop digital fluency

Our roadmap for testing this hypothesis has five main pathways of research activity:

1. Identify a core collection of tools and experiences
2. Define learning and fluency in the digital age by studying spontaneous uses
3. Examine differences across social groups, cultural contexts, and settings
4. Create and expand new activities for 'imagination' across a set of tools in an effort to take advantage of what kids are naturally engaging
5. Understand how digital fluency impacts kids' lives in school.

These strands each have a set of driving question associated with them.

1. Which digital tools are important to youth to extend their imaginations? How might these be best described?

The digital technology revolution seems to be everywhere. Television advertisements proclaim better and better rates for cell phones. Consumer electronics are available for purchase in grocery stores. Clouds of wireless signals that enable wireless Internet access ("Wi-fi") exist in the atmosphere, but are invisible to those without digital appliances.

In the swirl of it all, it is difficult to discern which of these digital tools are profound and which are passing fancies. It is difficult to casually determine which tools provide capabilities for users to become better at existing activities, and which introduce the opportunity to do fundamentally new things. It is not obvious which of these tools are positive and generative, or how one might create contexts for all these new gadgets that encourage their productive use.

And there are multiple, local vernaculars being used for describing tools that range from marketing jargon and technical buzzwords, rather than focusing on the core competencies of the tools. We identify our tools as phones or digital cameras or email or instant messaging or blogging, for example, yet the core activities are "voice exchange and storage", "image capture", "asynchronous text exchange", "chat", "storytelling" or "self publishing". And the intents of these gadgets are communication or observation or sharing or staying in touch or expressing one's worldview.

When tools identified, there will be an identifiable purpose that will map to general attributes of youth development which are generally acknowledged as important for adolescents, such as identify formation, ability to collaborate, and the development of independent perspectives and judgment.

2. How are these digital tools used spontaneously by youth?

Many instances of engagement of digital tools by youth have been in online environments that they have chosen to engage on their own. Instant messaging, music downloading, and blogging are examples of activities which are engaged frequently by youth on their own. Based on youth defined desires – to communicate with friends, to listen to music and to express themselves – youth have taught themselves how to use these very technically accessible capabilities and integrated them into their lives. Often these activities are highly connected into the social groups with whom youth interact; instant messaging is important only if one's friends instant message for example.

What happens though if these digital capabilities are introduced deliberately into an existing social group or organized settings, such as after school centers, museums, community centers and libraries? Will youth engage these tools in the same ways as youth who have been introduced to them in more naturalistic settings, surrounded by family and friends? And will all youth engage these tools, or are they appealing to only certain youth? Similarly, how will individuals engage the tools differently based on their interests, for example in technical issues, social interactions, or popular culture? And will these interests be the same in virtual worlds as in real worlds? So, for example, will

youth who are highly social in the face-to-face worlds be highly social in the virtual worlds or will they be less interested and engaged in the virtual world interactions?

Also, what about other digital tools that are "more technical" and require more training in order to gain basic competency? For example, will youth take advantage of digital cameras? Will they use these to create slide shows and other narratives, or will they be satisfied with collections of stills? What about movie cameras and software for movie making? Will students be daring enough to learn this on their own, and to take time to master these more complex tools? Commercial software, like PhotoShop or Powerpoint, can permit one to build design sensibilities and let youth demonstrate their sophistication in graphic design, and visual presentation. Alternatively, youth might find these tools constraining as a tool for expressing their ideas and imaginations.

Finally, how do youth explore technology opportunities together? Do they work in small groups or on their own? How does what one youth learns spread to other youth? How do they explain new capabilities to each other, or do they?

It will be important to document and capture spontaneous use of selected digital tools in informal learning settings with diverse populations of youth. It will also identify consistent findings from the literature which describe naturalistic acquisition of digital tool use patterns by media savvy youth who have had ready access to technologies over long period of times. From this examination (through careful documentation and mini-ethnographies), we can then begin to define what is means to be digitally-fluent.

Defining digital fluencies

The literature on the subject of digital literacy is substantial, but the focus tends to be on gaining workplace skills using standard productivity tools (e.g., word processing, spreadsheets). There are multiple approaches and theoretical perspectives on studying and understanding digital literacy. In this paper, we will begin with the following general sense of the attributes of digital fluency, based on a review of the literature conducted by Lyman et al (2004) and our own experience:

Table 1: Digital Fluency Framework: A Start

Social interconnections	using IM, forming collaborative groups, connections with email, pop culture websites
Technical comfort	using computers, cell phones, debugging printers
Interpretation & analysis	Pop culture discussion groups (rap lyric critique sites), on-line census figures, weather reports, spreadsheets, blogs
Design sensibilities	Page layout, image plus text, visuals, programming, customizing tools (ring tones, desktop images, and skins)
Research perseverance	using the internet, critiquing, evaluating information, search, learning about one's own community

	community
Self expression	story telling, movie making, composing music & raps, poster mockups, blogs, wikis
Buying/selling	eBay, amazon, home shopping, bargaining

In the course of our exploration, we expect to refine this framework, based on our observations of spontaneous use of digital tools, and our experience in providing youth with training with various tools.

3. Are there major differences across race, gender, socio-economic status when ready access to tools is provided to all youth?

The literature (see Lenhart et al, 2001) documents an extremely large "digital divide" between access and use of technologies between youth of different races/genders and socioeconomic classes. White upper middle class youth typically have easy access to both technological capability and a social support structure that helps them to incorporate technology into their everyday lives. There are many youth, typically youth of color, who do not have ready access to expensive technologies, and if they do they do have basic access they do not have the support structures that allow them to incorporate these technologies into their lives as they might like.

What if basic access to computationally powerful technologies is provided to underserved African American and Latino youth, in the context of strong social support structures? Will these youth incorporate these digital capabilities into their lives in the same way that more currently digitally savvy kids have done on their own? Will they form similar groups for instant messaging, for example, or create first movies in the same way? Will there be differences between the groups, based on differences in geographic isolation, for example, and the environments that students go home to at night? Will these new digital youth leapfrog the activities of early innovators, or are there stages of acquisition that will be in common?

Understanding these questions requires an examination of multiple social groups not just underrepresented populations to understand the differences in values, cultural practices, preferences and desired uses across different social groups, cultural contexts, gender and other relevant factors.

4. How do we foster digital fluencies in youth so they can engage in creative and generative activity with digital tools?

Spontaneous use of available technologies provides a general idea of how youth can engage these technologies, how attractive they are to them inherently, and how they invent ways to use these tools.

However, one can also approach this incorporation of digital tools in a more intentional manner. One can describe some ways in which digitally savvy youth and adults effectively engage digital tools, and to then provide explicit frameworks in which these digital fluencies might be encouraged in beginning groups. Many of these fluencies may be garnered spontaneously; Others may require some interventions, including deliberate exposure to all youth and the development of activities that require the use of certain tools. Our goal is to create and expand new activities for 'imagination' across a set of tools in an effort to take advantage of what kids are naturally engaging. Design activities which require that youth purposively engage their emerging digital fluencies in a meaningful context.

Closing Reflections

An opportunity exists to both draw upon prior research and a wealth of perspectives to study informal learning especially in the context of the digital divide and 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 technology 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.

Given that some ethnographic studies have already begun in this area, 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 might look like design-based ethnographies that engage youth audiences in participatory design activities enlisting youth as ethnographers in their own design process.

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