ABSTRACT

WebWatcher, a commercially available remote monitoring software for mobile devices, provided access to the digitally lived experiences of six low SES urban youth and represents a methodological frontier that holds great potential for innovatively collecting data. Access to the modes, mediums, styles, formats, and pathways in public and private spaces provides a level of data and potential understanding of how, what, where, when, and with whom lives are lived through the ever-present, “always on,” mobile technology. The inclusion of such methods propels researchers to think about qualitative epistemologies as we seek to better understand how and what we know about twenty-first-century lives.

Author Keywords
WebWatcher, remote monitoring, digital practices, connective ethnography, multimediality

INTRODUCTION

Youth increasingly use the internet to access information about current events, express opinions (e.g. blogs), create/access/exchange video and photographs (e.g. YouTube and Instagram), write (e.g. fanfic), remix images/sound, and create communities and social networks (e.g. Facebook, Instagram, Twitter). While many of these activities require internet connections, mobile communication devices are increasingly able to provide and enable those connections. Research is needed to better understand the relationships between youth, technology, and participatory communities with consideration of how a “wide range of actors (e.g. humans, texts, technologies, and objects) are brought into relationship with one another, and how these relationships have unique space-time qualities” (Leander & Lovvorn, 2006, p. 293).

Brown, Campbell, and Ling (2011) suggest there is value in treating technologies as a lens for understanding how social order is produced and reproduced through systems of communication. The use of mobile communication technology contributes to a host of social consequences, including representation of self, new forms of social connection, and private use of public space (Campbell & Park, 2008). “Understanding changes in contemporary communication practices that both draw from, and extend beyond, traditional principles of composition serves as an apt construct for exploring the nexus among youth, literacy, and technology” (Domingo, 2015, p. 7). Technology and social orientations combined with multiple perspectives provide access to the places and spaces in which youth move. “One of the most significant challenges in researching the social aspects of contemporary societies is to adapt the methodological approach to complex digital media environments” (Vittadini et al., 2012, p. 33). Research design must be as complex as the object of study itself (Beneito-Montagut, 2011). Vittadini et al. (2012) suggest that methods used in the study of learning and social practices must consider four key issues:

1. The complexity of youth practices blur the boundaries of on- and offline experiences. This suggests that (a) youth communicate in techno-social ways and (b) research methods need to focus on the user, not the specific space.
2. Youth act performatively. (a) They are accustomed to a mode of writing oneself into existence and (b) representations are in multimedia forms and consist of text, image, photo, and video.
3. Youth act reflexively or knowingly. They are aware of the communication role (public, audience, social network performer).
4. Youth act and learn in a complex mediated society. (a) Multiple tools are required to understand who youth are and how they construct their being. (b) Methods that provide access to multiple layers of being add depth of understanding and produce complementary pictures of the object under study.
Following youth along their complex sociotechnical paths is challenging. To better understand the lives of young digital users' research cannot ignore the multi-situated performativity and multimediality of online communication (Vittadini & Pasquali, 2013). The methodological challenge is how to make those materials and spaces accessible (Stanczak, 2007).

The question guiding this research was: What are the literacy practices of low socio-economic urban youth in the era of mobile technology? The aim was to investigate what literacy practices youth are engaged in and to understand the depth and breadth of their individual and networked digital geographies (Vasudevan, 2010), those physical as well as digital spaces they visit and inhabit. A deliberately complex design that incorporates remote device monitoring in combination with observation and interview methods provided a level of data that supported the researcher’s ability to provide a thick description of lived experiences or what Selwyn (2011) refers to as the “messy reality” (p. 164) of digital technology use.

YOUTH AND DIGITAL PRACTICES
This research was structured as a case study (youth using mobile technology) with a connective ethnography methodology. Connective ethnography seeks to understand the flow of the individuals’ practices across a multitude of spaces (boyd, 2008; Fields & Kafai, 2009) and is not predetermined by the researcher/observer. The implications for connective ethnography include (1) multiple sites of interaction (Hine, 2005); (2) cultures are permeable, interactive, and dynamic (Lincoln, 2005); (3) culture is discursively formed through language including but not limited to meaning-making created through oral, text, symbol, image, gesture, or sound (Kress, 2003, 2010; Leander & McKim, 2003). By blurring the boundaries of placed-based and digital practices and focusing on the flow between, across, and within the places and spaces that participants experienced, a more realistic view of those lives is possible.

The Study
This study was composed of six low SES urban high school students (2 females, 4 males), aged 16-18, in the northeastern United States. Data collection methods included observation (1 week/participant), interviews (3/participant), journals, WebWatcher (2 weeks/participant), a focus group, and field notes collected over 12 weeks. The data collection matrix (Table 1) illustrates the connection and flow of this study from questions that guided understanding to methods and timing.

<table>
<thead>
<tr>
<th>Need to know</th>
<th>Why needed?</th>
<th>Collections methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>For what purposes are devices used? (social networking, interest, learning, relationships, information)</td>
<td>Are devices used in similar/dissimilar ways?</td>
<td>Interviews, Observations, Journal, Tracking of usage/dialogue</td>
</tr>
<tr>
<td>What does their engagement look like?</td>
<td>What do the semiotics and discourse look like?</td>
<td>Interviews, Journal, Tracking of usage and dialogues</td>
</tr>
<tr>
<td>What literacy practices are utilized on a routine basis?</td>
<td>How simplistic/complex are routine literacy practices?</td>
<td>Downloaded discourses, Interviews</td>
</tr>
<tr>
<td>Duration of each engagement over time?</td>
<td>See the larger picture of literacy practices.</td>
<td>Tracking of usage/discourse, Journal</td>
</tr>
<tr>
<td>Do semiotics differ across modes or are there commonalities?</td>
<td>Text, audio, picture, symbols are critical in the formation of meaning.</td>
<td>Tracking of usage/discourse</td>
</tr>
<tr>
<td>Perception of self within the space created by each mobile technology?</td>
<td>The perception of self is a critical part of socio-cultural environs which vary amongst “communities.”</td>
<td>Interview, Literacy Log, Focus Group</td>
</tr>
<tr>
<td>Networking practices– what do the connections look like?</td>
<td>Are there connections between the various technologies and communities?</td>
<td>Interview, Journal, Tracking of usage/dialogue</td>
</tr>
</tbody>
</table>

Table 1. Data Collection Matrix
Two analytic frameworks, qualitative content analysis and multimodal discourse, were used sequentially to analyze the corpus of data (see Table 2). Qualitative content analysis was used to identify themes and concepts across the data as it was collected (Foreman & Damschroder, 2008; Hsieh & Shannon, 2005). The summative approach to qualitative content analysis was specifically used with the WebWatcher data. Multimodal discourse analysis complemented the qualitative content analysis coding process by looking at what and how themes were created, conveyed, and communicated (Kress, 2010).

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview transcripts</td>
<td>15-40 minute interviews</td>
</tr>
<tr>
<td>Observations</td>
<td>30 school days</td>
</tr>
<tr>
<td>Field notes</td>
<td>40 entries</td>
</tr>
<tr>
<td>Literacy logs</td>
<td>6 logs (48 entries)</td>
</tr>
<tr>
<td>Text messages*</td>
<td>5,563</td>
</tr>
<tr>
<td>Facebook interactions*</td>
<td>1,248 postings/2,593 searches</td>
</tr>
<tr>
<td>Internet searches*</td>
<td>7111 (112 sites)</td>
</tr>
<tr>
<td>Photographs*</td>
<td>725</td>
</tr>
<tr>
<td>Videos*</td>
<td>36 segments</td>
</tr>
<tr>
<td>Focus group transcript</td>
<td>1 interview-60 minutes</td>
</tr>
<tr>
<td></td>
<td>10 members</td>
</tr>
<tr>
<td>(*Denotes data collected via WebWatcher)</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2. Data Corpus**

**DATA COLLECTION AND CAPTURE**

Data capture was made possible by a commercially available remote monitoring software called WebWatcher. WebWatcher uses an architecture that monitors and records user activity on whatever device the software has been loaded onto. Data is recorded, encrypted, and transmitted through a secure connection to a remote server. The user then logs onto the server through a portal to view recorded data.

Selection of WebWatcher was premised on specific goals that aligned with the underlying epistemology of the research design and questions. In using this software to gain a deeper understanding of these youth, certain aspects were deemed critical: publicly available, easily installed and removed, works on all devices, tamper-proof, remote monitoring, transparent monitoring, and no noticeable change in device functionality. Remote monitoring differs from *spyware* in that it requires informed consent and physical access to the target device.

Technology, and software in particular, is intrusive and has the potential to expose participants’ lives. To ensure transparency informational letters were sent home and a meeting was held with parents, guardians, and participants. Following IRB protocols, the study purpose, methods, participant role, as well as the exact level of detail accessible via the device monitoring were addressed and demonstrated. Each participant was informed of his/her right to withdraw from the study and withhold any data they were uncomfortable sharing. In discussing the intrusiveness of the monitoring, participants voiced no personal discomfort and instead saw it as an opportunity for their voices to be heard.

Everybody…the news, teachers, parents…they all tell us what we do is bad for us…nobody asks what we do with these [holds up phone]…maybe being here [in the study]…others might hear what we got to say…how and why we use our phones…it’s not what they think…(Cris, interview)

WebWatcher tracked and recorded participants’ text messages, internet searches, social networking activity, keystrokes, photos, videos, email, logged voice calls (Figure 1) and tabulated the number of visits and duration during specified periods (Figure 2). WebWatcher disclosed how each participants’ devices were routinely used as well as the type, intensity, spaces, modes, and connections made.
Information collected through WebWatcher was checked and verified during participant interviews. Data were inductively coded and the categorization of codes was reflected in the themes. WebWatcher data was also used to formulate journal prompts that specifically addressed individual participant’s unique practices and/or interactions.

FINDINGS

Three themes emerged from the data.

Engagement in Learning
Mobile technology affords youth the possibility of in-the-moment learning. The immediacy of the information reinforces the desire to know. Participants found that the ability to formulate questions, seek, and find information immediately, meant they were more invested in learning. They found the information garnered during these knowledge quests remained longer in their memory than more traditional forms of learning (Focus group, journals). In one English class, students struggled with text in Arthur Miller’s, *The Crucible*. The teacher instructed them to write out two questions they had about the text, search for answers using their phones, and then share their findings with a small group. During this period a dramatic shift in energy and focus occurred in the classroom. Students searched various places, found answers that were meaningful to them, shared information, then re-engaged in the lesson within 15 minutes (field notes). In later interviews, participants focused on the importance of this learning event and repeatedly stated that it was important to have their technology-based culture acknowledged and incorporated into learning spaces. Facilitated learning, augmented by mobile technology, in a participatory environment is what they are seeking.

In another example, Leigh* had been struggling in her science and Spanish class (interview). Not wanting to carry heavy books home she decided to see if there was anything she could access from her phone. Within minutes she found her science book online and downloaded a free copy. She then set out to find a free language app that appealed to her style of learning—short lessons, highly visual, and game like. With these tools, literally in her pocket, she accessed the material daily and sought answers to questions as they emerged, which resulted in her grades and sense of self as a student improving dramatically (interview, journal, Webwatcher).

* pseudonym
**Communication Hierarchy**

Connecting—particularly through text messaging—had a deep impact on participants' lives; its use offset feelings of loneliness, isolation, and frustration, and created feelings of safety and love (Rian, Cris, De'von, Leigh, Focus Group). Text messaging was more than just an informal space in which to hang out; participants used it to feel that they were a part of a known and intimate community. It was only in that space that feelings, emotions, and detailed thoughts were expressed. Text messages were structured, reviewed, and reflected before and after being sent (Cris, Leigh, Niesha). Text messaging was not just about finding out where someone was or what they were doing in a specific moment, it provided both a place and space to “talk” about issues of great importance to them. While Facebook was the place where they went to check on what others were doing or thinking, these participants were not avid contributors to social networking sites (i.e., Facebook), citing, “There’s so much drama on Facebook …what’s the point of putting your life story on FB…it’s too much…” (Niesha, interview).

**Trust**

Trust was a major factor in participants’ use of social network sites and participatory communities, and because of a lack of trust, they limited their engagements. Even though they could limit their Friends on Facebook, they did not place much trust in what was said, how things were stated, and how things were interpreted. The sheer volume of participants’ searches demonstrated desire, interest, motivation, and self-directed learning (Table 2). While they actively and frequently sought information from the internet, it was the style of their engagement that provided a new perspective. There is a significant body of research that documents how youth actively engage with others in online spaces, seeking out others and communities based on shared interests (Black, 2009a, 2009b; Gee, 2009, 2010). Participants engaged in solitary endeavors, seeking information but purposefully not engaging with others not previously known in their physical world: “I just don’t conversate with people that I don’t know” (Niesha); “I never joined an online group or shared ideas or writing or music…am not that kind of person” (Focus group). Participants’ hesitancy and inability to trust those unknown and outside their community and culture created a barrier that effectively restricted their ability to actively engage/participate in online communities. This finding differs from the Nonnecke, Andrews, and Ereee’s (2006) study of non-public participation that suggested non-engagement posting philosophies were premised on shyness or feelings of having nothing to offer.

**DISCUSSION**

**Methods**

To develop a better understanding of youth today we cannot ignore or limit the multi-situated, multimodality, and multimediarity of online communication and spaces. To focus on the individual, following them wherever they go, challenges us as researchers to review our epistemological stance. How do we seek to know and understand youth experiences and practices? As Farmsworth and Austrin (2010) suggest the notion of social space is of primary importance. The methodological challenge becomes how to make those materials accessible (Stanczky, 2007). Remote monitoring software in conjunction with other, more traditional ethnographic methods can better inform our understanding of the fluidity of individual lives. A design that incorporates device monitoring with observations and interviews can provide a level of data that supports the researcher’s ability to provide a thick description of lived experiences or what Selwyn (2011) refers to as the “messy reality” (p. 164) of digital technology use.

**Ethics**

Recognizing and addressing the risks associated with participants, researchers, institutions, and data are critical research components. The challenges for today’s researchers lie in applying these to on- and offline environments that intersect in shifting ways (Livingstone & Locatelli, 2014). Just because data is accessible does not mean it should be collected. Issues related to the difficulties of obtaining informed consent (especially for secondary/networked participants), the life of the data (peristence), and the challenge of anticipating future contexts of use mean that the ethics of data collection is increasingly complex. When minors are involved, informed consent must address and ensure that participants and their legal guardians are “fully informed about the purpose, process, and outcomes of the research and that any personal information collection should be kept confidential and the participants should remain anonymous” (Livingston & Locatelli, 2014, p. 75). Digital dilemmas that must be addressed when using such research methods as remote monitoring include: (a) data collected from those who have not consented, (b) inadvertent collection of data from secondary participants, (c) individuals may reveal more of themselves than intended, (d) traceability of online participants, (e) opportunities for participants to limit access, and (e) procedures for revealed situations that suggest concern for any issues of personal safety. It is the hope that this paper will encourage discussion about methods such as the use of device monitoring software as well as the larger questions of research epistemologies in the digital age.
CONCLUSION

Ours is an interconnected world but understanding why, when, where, and how we fluidly move across these spaces is critical. Adopting a connected approach to technological and social orientations along with a multimodal perspective made more accessible via device monitoring provides access into the discursive spaces in which individuals live. Meaning-making via mobile technologies now includes more possibilities for the multimodal integration of alphabetic strings, images, photos, sound, and video and the affordance associated with those online, screen-based, and mobile interfaces. Technology, in this regard, has created an observable change in how individuals engage within digital environments (Kress, 2010). Device monitoring software can provide researchers with a powerful tool by providing access that can facilitate understanding of how discourses and spaces are influenced by a variety of social and cultural practices, revealing the complexity of meaning-making in the lives of youth.

The benefits of incorporating device monitoring tools such as WebWatcher into research include: (1) attending to all modes of digital communication, (2) looking at one medium and or mode in relation to others, and (3) attending to issues related to the platform or available resources. When used in combination with other methods it deepens our understanding of nuanced meaning-making. In choosing to focus upon only one medium, mode, or platform we risk losing details that may lead to a more informed understanding. We must re-examine how it is we come to “know” how lives are lived in the plethora of places and spaces inhabited today. To better understand how individuals engage, participate, collaborate, and learn in the 21st century researchers must be cognizant of the on- and offline spaces individuals inhabit and find and utilize a variety of tools and methods to more realistically observe lives as they are lived.

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