

Informal learning and identity formation in online social networks

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All students today are increasingly expected to develop technological fluency, digital citizenship, and other twenty-first century competencies despite wide variability in the quality of learning opportunities schools provide. Social network sites (SNSs) available via the internet may provide promising contexts for learning to supplement school-based experiences. This qualitative study examines how high school students from low-income families in the USA use the SNS, *MySpace*, for identity formation and informal learning. The analysis revealed that SNSs used outside of school allowed students to formulate and explore various dimensions of their identity and demonstrate twenty-first century skills; however, students did not perceive a connection between their online activities and learning in classrooms. We discuss how learning with such technologies might be incorporated into the students' overall learning ecology to reduce educational inequities and how current institutionalized approaches might shift to accommodate such change.

Keywords: informal learning; identity; social network sites; high school students; technology; twenty-first century skills

Introduction

The contexts for teaching and learning today have become increasingly complex as students learn across a range of physical and cyber spaces. Several factors are driving recent efforts to examine students' learning experiences outside of school, including concerns about retention, academic achievement, school completion, and workplace preparedness, as well as reports of students' dissatisfaction and disconnection from school (DeGennaro 2008; Levin et al. 2002; Spires et al. 2008). Moreover, educational leaders are observing how networked social media (e.g., Social network sites (SNSs), blogs, RSS technologies, etc.) are positively transforming practices in other fields such as business, journalism, and politics (Gratton 2007; Sheehy 2008; Stone 2007), and some are now inquiring how education can similarly transform by harnessing technologies students already use in their daily lives (Bull et al. 2008; Greenhow, Robelia, and Hughes, 2009).

Situated in this context, this study builds on recent efforts to accurately characterize and differentiate SNS usage among different groups of users (Hargittai 2007). Our research explores SNS uses and perceptions among high school teenagers from low-income families, an adolescent subgroup rarely featured in either the scholarly or popular discourse. With over a third (35%) of children ages 13 through 17 years – 7.4

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million teens – living in low-income families in the USA, the proportion of these children attending our nation's schools is significant (Douglas-Hall, Chau, and Koball 2006, 3).

In this study, we sought to examine students' views of using an SNS, MySpace.com, for learning in and out of formal schooling and the influence of SNS capabilities on students' formation of identity. The following questions guided this investigation:

- How do students view using SNSs for learning in and out of school?
- What role do SNSs play in the formation of learner's identities?
- What kinds of twenty-first century learning do students demonstrate in their SNS, if any?

In order to address these questions, we begin by defining several key features of SNSs. Next we ground our investigation in the relevant theoretical and empirical literature related to formal and informal learning, identity formation, and twenty-first century skills. We provide a brief overview of our research methods before presenting the results. The goal of this paper is to articulate how the insights gleaned from this research might help us make education more engaging and relevant for students.

Social network sites: a definition

Boyd and Ellison define an online *social network site* as:

A web-based service that allows individuals to (1) construct a public or semipublic profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system. (2007, 1)

What distinguishes SNSs from other forms of virtual communities is that they allow users to articulate and make visible their social networks. The process is similar to allowing others to view your address book and interact with it online. In this way, one's social connections potentially become the connections of one's 'friends.' Boyd and Ellison (2007) suggest that these 'friending' behaviors through SNSs can result in more and different types of connections between individuals that would not otherwise be made (Ellison, Steinfield, and Lampe 2007; Haythornthwaite 2005). Another commonly used term, 'social networking' implies that people use these websites in order to forge *new* networks. In this paper, we use the term 'social network' site (SNS), also referred to as 'participatory media' and 'networked social media' (Barnes 2006), to mean a Web-based service through which individuals can maintain existing ties and develop new social ties with people outside their network (Jones et al. 2008).

Although much of the research on the use of SNSs is still emerging, the handful of published conceptual and empirical studies that exist stem mostly from communications, information science, sociology, economics, political science, cultural studies, and computer science (Boyd and Ellison 2007). Few studies explore the link between SNS use and education (e.g., see Boyd and Ellison's comments on the lack of research in this area). Missing from this research are the actual voices and experiences of middle and high school age adolescents. SNS use among high school students seems an important topic for learning and media researchers to examine given the popularity of

SNSs among high school age youth (Lenhart and Madden 2007), the emphasis on developing twenty-first century competencies in all learners and recent suggestions that such non-school social spaces may be key aspects of a student's overall learning ecology (Barron 2006).

Exploring the learning ecology: formal, informal, and non-formal learning

Recent studies suggest that many youth are increasingly turning to information and communication technologies as learning tools outside of school. Levin et al. (2002), in a national survey of US teens, reported a 'digital disconnect' between internet-savvy students and their schools. Students reported limited use of the internet in school when compared to how they used the internet outside of school – finding virtual textbooks, backpacks, study groups, and guidance counselors. In another study of 4000 middle school students in the USA, students recounted their technology-using practices outside of school and suggested that more 'creative,' 'interactive,' and 'media-oriented' uses of technology in school would lead to their increased engagement (Spires et al. 2008). In the UK, Livingstone and Bober (2004) investigated 9–19 year olds' use of the internet through qualitative interviews and observations and with a national survey of young people ($n = 1511$) and their parents ($n = 906$). They reported that the majority of children and young people had gained school or domestic internet access, but the nature of *use* varied considerably across gender, age, and socioeconomic status categories (Livingstone, Bober, and Helsper 2005) and across schools (Livingstone and Bober 2004). Approximately, 49% of full-time education students had received little or no formal instruction on how to use the internet (Livingstone and Bober 2004). The majority of students regarded the internet as an information-gathering tool that could be useful in doing school work, but appeared 'far more excited' by its communication and participation possibilities (Livingstone and Bober 2004, 405), which they seemed to employ largely outside of school. Although many schools ban online SNSs, in a recent US survey of 2000 students (9–17 year olds) who used them, *education* was identified as a common topic of conversation in messages sent over SNSs. Surprisingly, 60% of students surveyed reported using their SNS to talk about education topics and 50% to talk specifically about schoolwork (National School Boards Association 2007).

Such reports have stimulated renewed interest among educational policy-makers, reformers, and learning researchers in understanding better the nature of students' learning processes with participatory media in formal and informal learning contexts and their interrelationships (e.g., see commentaries from the 2008 National Technology Leadership Summit in the USA) (Bull et al. 2008; Erstad, Gilje, and de Lange 2007; Greenhow 2008; Peppler and Kafai 2007). However, definitions of *formal* and *informal* (and *non-formal*) learning are contested, and often misunderstood (Sefton-Green 2004). The National Science Teachers Association (NSTA) in the USA defines informal and formal learning relevant to K-12 education (NSTA 1999). We draw from the NSTA (1999) position statement, which stipulates that *informal learning*:

- complements, supplements, deepens, and enhances classroom studies;
- emphasizes creativity through the need to attract non-compulsory audiences;
- does not use a formal set of guidelines, objectives, or curriculum to guide interactions between participants or state what participants should gain from interactions with media;

- extends to the affective, cognitive, and social realms;
- presents opportunities for mentors, professionals, and citizens to share time, friendship, effort, creativity, and expertise with youngsters and adult learners; and
- allows for different learning styles and multiple intelligences and offers alternatives for non-traditional and second-language learners.

Informal learning, as we define it, is spontaneous, experiential, and unplanned. Students can engage in various informal learning processes with social software such as observation, imitation, collaboration, and apprenticeship (Jenkins 2006). This definition contrasts with *non-formal* learning where one has certain objectives in mind and actively seeks information from sources that may include peers, mentors, or media. Thus, if a student learns how to upload and download media files in the process of building a *Facebook* account on her own such would constitute *informal* learning. However, if that student asks a friend to help her figure out how to add a different layout to her *MySpace* profile, she is engaging in *non-formal* learning. Both situations differ from *formal learning* situations in which some agent, a teacher, an educational software program, or a learning management system, is directing the student's learning. The agent guides the student through a formalized set of objectives typically generated by an outside authority, such as curriculum standards developed by professional organizations or mandated by the government.

In reality, students practice formal, informal, and non-formal learning across a wide range of contexts and exercise considerable authority over how they learn, when they learn, and with whom. Grounded in sociocultural, activity, and situated learning theories (Cole 1996; Engestrom 1987; Greeno 1989; Vygotsky 1978), a *learning ecology* perspective (Barron 2006) helps conceptualize and bridge learning across the spaces of home, school, work, and community. Barron defines a learning ecology as the 'set of contexts found in physical or virtual spaces that provide opportunities for learning' (2006, 195). This notion of a learning ecology stipulates that: (1) adolescents are simultaneously involved in many settings; (2) they create learning contexts for themselves within and across settings; (3) the boundaries between settings can be permeable; and (4) interest-driven activities can span contextual boundaries and be self-sustaining given adequate time, freedom, and resources (Barron 2006, 199–201). In other words, what is learned outside of school can shape what is learned in school as students seek out projects based on their interests. In turn, school projects can stimulate students' interest – thus motivating them to seek more information, opportunities, and like-minded people with whom to learn on their own terms (Barron 2006).

In this qualitative study, we sought to investigate aspects of the learning ecology inhabited by high school students from low-income families. Building on US surveys that report the majority of young people, ages 12–17 are using SNSs (Lenhart and Madden 2007) and local surveys that report similar findings for students from low-income families in the upper Midwest (Greenhow, Robelia, and Kim 2008; Greenhow, Walker, and Kim 2008), our goals were to illuminate these students' activities within their online SNS, determine what if anything students were learning in these out-of-school spaces and how they interpret their experiences, and use these insights to begin to inform pedagogy and avenues for future research.

Social networks as spaces for identity formation

Understanding identity formation, and how individual learners engage in identity work in various socio-technical settings, is important to understanding youth-initiated learning (Barron 2006). Adolescence is a time when young people explore the physical, sexual, occupational, and ethnic dimensions of their identity within a larger social context. The self they experience and display can have positive and negative consequences. Youth have long been forming their identities while being scrutinized by adults in public spaces, such as schools, places of worship, and community centers. Schools, especially, have always taken part in students' struggles to emerge from what Erikson (1968) termed the 'identity versus role confusion' stage of development.

Of course, various conceptions of identity exist, as Buckingham explains:

Much of the debate around identity derives from the tensions between... two aspects. I may struggle to 'be myself' or to 'find my true self,' and there are many would-be experts and authorities who claim to be able to help me to do this. Yet I also seek multiple *identifications* with others, on the basis of social, cultural, and biological characteristics, as well as shared values, personal histories, and interests. On one level, I am the product of my unique personal biography. Yet who I am (or who I think I am) varies according to who I am with, the social situations in which I find myself, and the motivations I may have at the time, although I am by no means entirely free to choose how I am defined. (2007, 1, emphasis added)

In psychology, Erikson (1968) described identity formation in his theory of developmental stages, which extend from birth through adulthood. According to Erikson, adolescence is a critical period of identity formation; adolescents must undergo a *crisis* in which they deal with uncertainty about their values and ideals, sexual identity, and future occupation or career, and through a period of self-reflection and experimentation, accomplish the task of integrating their prior experiences and characteristics into a stable identity. The process of identity formation, therefore, is both an individual cognitive process and a social process, carried out among and in negotiation with others (e.g., families, peers, teachers, etc.).

Like Erikson, sociologist Erving Goffman (1959) was concerned with how young people are eventually prepared, or prepare themselves, to embrace their allotted roles in adult life (Buckingham 2007). In his book, *The presentation of self in everyday life* (1959), Goffman discusses the *performative* aspects of identity formation. He emphasizes individual agency, or the notion that people are actors, creating or presenting themselves by playing different roles on different stages to different audiences (Goffman 1959). According to Goffman, people intentionally or unintentionally express themselves and others, in turn, are *impressed* by them. These identity performances, then, can also be conceived of as *impression management* by which people (consciously or subconsciously) modify their behavior to influence the impression other people have of them (Goffman 1959, 6).

Still other conceptions of identity formation are concerned with the changing nature of identity in society (Buckingham 2007). Judith Butler (1990), for example, argues that identity categorizations (e.g., identifying as 'women,' etc.) are too restricting because they emphasize binary views of gender and limit possibilities for other, more fluid or subversive, formations of gender and sexuality (Buckingham 2007; Butler 1990, 22–34). Despite their differences these conceptions emphasize the notion of identity formation as a *process*: 'identity is something we *do*, rather than simply something we *are*' (Buckingham 2007, 8). We view identity formation as dynamic,

self-reflective, and performative, rather than something that just is, or that we develop into and sustain.

Similarly, Slater (2002) discusses the performative aspects of identity online; that is, you become what you type. He argues that new media provide spaces within which people can perform whatever identity they choose and create new and multiple identities inconceivable in offline worlds (Slater 2002). Today's youth experiment with different identities, or 'dynamic and shifting constructions and presentations of self' (Coiro et al. 2008, 526), through Web-enabled authorship in the form of homepages, blogs, and online SNS profiles (Steinkuhler 2008). Stern (2007) describes how youth use online authorship to work out their personal beliefs, challenge cultural assumptions, and navigate complex relationships. She notes that many young people recognize the value of online self-presentation and promotion among peers and others.

Within SNSs, the creation of online personal profiles and the formation of social networks impacts directly on the expression of identity and how identity is performed and reinforced. In the creation of online profiles, adolescents have the ability to develop an image of how they see themselves and want others to view them (Williams and Merten 2008). Williams and Merten argue that the internet has the potential for creative disclosure within a safe outlet for self-expression:

Adolescents who feel they have lost their voice or are unheard by authority figures in their personal lives can channel their energy and need for attention into their online journal, versus feeling confused, worried, negative, misunderstood, or physically acting out. (2008, 257)

Boyd (2007) identifies four aspects of self-presentation in SNSs that differ from the processes of identity formation offline and have implications for education: (1) persistence – speech is ephemeral but electronic text can be stored indefinitely; (2) searchability – a journal in a drawer is very different than putting thoughts in an environment where people can look for specific names and places; (3) replicability – electronic media make it very easy for others to duplicate and change what one/another has created; and (4) invisible audiences – one cannot tell who is online reading our thoughts and what we write can be read in a context that is different than what we intended (126).

As youth increasingly connect with peers online, these characteristics of SNSs (persistence, replicability, searchability, audience invisibility) present both educational benefits and risks that warrant educators' awareness and guidance. Developing awareness of the risks and benefits of new media is part of developing one's ability to practice *digital citizenship*, just one of a number of twenty-first century competencies required of young people today, as discussed briefly in this next section.

Twenty-first century skills: desired competencies for today's learners

In the USA and across the world, a host of educational agencies emphasize that youth must cultivate *twenty-first century competencies* if they are to be academically successful and prepared for future workplaces in a global knowledge economy. Broadly, these emphasize technological fluency, innovation, communication and collaboration, research and information fluency, problem-solving, and digital citizenship (National Research Council 1999).

For instance, the International Society for Technology in Education (ISTE 2007) and Partnership for 21st Century Skills (2008) in the USA have formulated definitions

of six important *twenty-first century* competencies, each of which will be described briefly. *Creative thinking* is defined as the ability to construct knowledge and develop innovative products and processes. *Communication and collaboration* is the ability to communicate in multiple media and to work collaboratively to support individual and collective learning. *Research and information fluency* is the capacity to locate, organize, evaluate, and synthesize data from a number of sources and present the results. *Problem-solving* is the capacity to define problems and manage activities towards a range of solutions. *Technological fluency* is the ability to select and use technology applications and systems effectively and productively, including the capacity to troubleshoot and transfer learning to new systems as they develop. *Digital citizenship* is the ability to practice and advocate online behavior that demonstrates legal, ethical, safe, and responsible uses of information and communication technologies. Moreover, US educators are expected to develop and model these competencies as well as facilitate their development in students (ISTE 2008).

However, among the above list of competencies, the concept of *digital citizenship* may be especially difficult to define, demonstrate, and measure for a number of reasons. For instance, conceptions of citizenship and citizenship education abound and definitions of online citizen-like behaviors that are legal, ethical, safe, and responsible will vary among countries, cultures, school systems, and standards-setting agencies, despite the fact that the internet, and students' behaviors on the internet, in many ways transcend physical boundaries.

Traditionally, definitions of a digital citizen have referred to one's use of electronic resources or environments to fulfill his or her duties as a citizen, including filling out online forms, accessing information about one's government, monitoring governmental activities through this information and providing requested online feedback (Bentivegna 2002, 2006). Such conceptions of a digital citizen typically led to observations about inequality of access to online information and to discussions about how this 'digital divide' could be gapped (Bentivegna 2002, 50–1). However, newer forms of social software, such as blogging, *MySpace*, and other Web 2.0 applications, have corresponded with discussions about how to prepare young people not only to become informed and watchful citizens, but also to promote their participation in civic life through internet-based volunteering, campaigning, and lobbying as well as through the creation of 'youth media' (e.g., blog entries, e-zines, podcasts, videocasts, online communities) that present discussion and debate about political, social and cultural issues (Selwyn 2007, 2–3). Bentivegna explains:

...new technologies can be used to promote citizen participation in debates regarding matters of concern to the public... this underscores the opportunity to invent new forms of community, albeit virtual, within a public sphere where citizens can debate politically significant subjects. (Bentivegna 2002, 51)

In this vein, Ribble and Bailey have expanded the concept of digital citizenship to include not only access to information but also *norms of behavior* (2004, 13) regarding the use of information and communication technologies for civic participation. From a review of related literature, Ribble, Bailey, and Ross (2004) identified nine elements of digital citizenship, including: digital etiquette, digital communication, digital access, digital literacy, digital commerce, digital law, digital rights and responsibilities, digital health and wellness, and digital security. Although a full explanation of these nine elements is beyond the scope of this paper, their conception of digital citizenship reinforces the notion of an informed and participatory citizenry

whose online behaviors simultaneously uphold standards for legal, ethical, safe, responsible, and respectful uses of technology. These views are resonant with the standards put forth by the ISTE in the USA, which emphasize social responsibility and ethical decision-making in its definitions of digital citizenship within the National Educational Technology Standards for Students (2007) and Teachers (2008).

In light of these definitions, we view young people's ability to practice digital citizenship as including their developing awareness of social and political issues and online participation in public life. Moreover, quality online participation, in our view, entails demonstrating respect for the rights and responsibilities of self and others in the digital commons, including using and knowing how to use SNSs safely by adjusting privacy settings, downloading music and other media files legally, posting messages that are respectful to their online community, and encouraging others to practice responsible online behaviors.

Outside the USA, the United Nations Educational, Scientific and Cultural Organization (UNESCO 2008) advocates twenty-first century competencies similar to the ISTE standards defined above, within its 'media literacy' curriculum. This curriculum emphasizes: questioning media and information, production, languages (how the medium influences the message), representations (how different groups are portrayed), and audience (who is watching, listening, reading). UNESCO supports the development of a 'family of 21st century survival literacies' (Horton 2006, 15), which include 'media literacy,' 'computer literacy' (hardware, software, applications), and 'information literacy' as part of the toolkit students need to practice quality citizenship behaviors.

Despite this variation in terminology across countries, fields of education, and standard-setting agencies, there is much overlap (Livingstone, Van Couvering, and Thumin 2008) and statements pertaining to competency in the twenty-first century generally advocate basic technological proficiency and participation in a digital citizenry. Therefore, we focus on these last two standards: *technological fluency* and *digital citizenship* within the ISTE framework defined above and use this framework as a lens through which to examine students' learning in SNSs. Moreover, students' ability to perform these competencies within SNSs, in particular, seems especially important for equitable access to learning and career opportunities as educational and professional networking moves online (Childnet International 2007). According to a survey by the National Association of Colleges and Employers published in March 2008, US employers will not only use online SNSs to vet profiles of potential hires, over 50% will use sites like Facebook.com and LinkedIn.com to prospect for talent, promote their accomplishments, and recruit top candidates (Rosenbloom 2008). Participation in such online professional networking opportunities seems especially important for high school and first-generation college students from low-income families who typically lack access to the local career-enhancing networks available to their more affluent peers from college educated families.

If, in reality, the majority of US teachers use computers and the internet with their students *less than 15 minutes per week* (Norris et al. 2003) compared to the average of 1 hour and 41 minutes students spend online outside of school (Kaiser Family Foundation 2005), incorporating students' out-of-school experiences into expectations for formal learning may be the only way to surpass classroom constraints and develop the twenty-first century competencies we espouse.

Research methods

The research study described here was part of a larger six-month effort to examine low-income students' perceptions, activities, and conditions in using the internet and SNSs. Students participating in the study were all from families whose incomes were at or below the county median income (at or below \$25,000). Students were recruited through an after-school program aimed at increasing college enrollment for low-income students. We conducted surveys and focus groups with students in the winter of 2007 ($n = 852$) and spring of 2008 ($n = 600$) to discern their internet access, use, and capacity. The findings of these prior studies are reported elsewhere (Greenhow, Robelia, et al. 2008; Greenhow, Walker, et al. 2008).

To further investigate trends we were seeing from students' self-reports and answer our research questions above, we conducted a series of qualitative case studies with students identified through our survey research who all used MySpace.com as their primary social network. Eleven participants (eight women and three men) were selected who varied along several dimensions. Our participants ranged in age from 17 to 19 years old, self-identifying as Asian, African American, or Latino. They were all public school students from low-income families living in a large metropolitan area.

We were interested in how students of varying activity levels integrated the *MySpace* system into their lives. Therefore, student-participants were evenly split between 'high' *MySpace* users, defined as using the SNS for an average of 30 minutes or more every day, and 'low' users, defined as using the SNS at least twice per week for an average of 30 minutes. All students in the study had an internet-connected computer at home and had been using *MySpace* regularly for at least a year.

Attempting to understand the nature of students' use of their SNS merited a semi-structured qualitative research design which focused the data collection process, maintained design flexibility to allow inductive hypothesis generation, and considered the validity of the young people's experiences and narratives (Denzin and Lincoln 1994; Maxwell 1996). Although the results from such a study are not generalizable to the population at large, the findings and analysis generated from this qualitative study may resonate with the experiences of adolescent *MySpace* users in similar circumstances and be enlightening for educators who work with similar students and seek to understand their online practices.

To understand how participants used *MySpace* in accordance with our research questions, we triangulated multiple data sources including: (1) semi-structured interviews (Seidman 1998); (2) think-alouds (Clark 1997); and (3) content analyses of participants' *MySpace* pages. First, all interviews were conducted in-person, audio-taped and lasted from 60 to 90 minutes. Interviews included questions about demographic background and SNS use (e.g., On a typical day, when you login to your *MySpace* what do you usually do there? Why? What are your reasons for using *MySpace*? Can you give me an example of some of the ways you get your ideas, interests, or emotions across on these sites, if at all? Do you see any problems or difficulties with using *MySpace*? Any benefits to using *MySpace*? How did you learn to use *MySpace* features? What are the unspoken rules or expectations for participating in *MySpace*? What do you think you are learning, if anything, in using this site as you do? etc.). We transcribed each interview and analyzed the typed transcripts using open-ended coding followed by thematic coding around categories corresponding to our research questions.

Second, students engaged in a think-aloud, a technique that involves asking study participants to report thoughts related to performance of a task as it is unfolding (Clark 1997). We asked our participants to talk-aloud as they engaged in their *MySpace* site, prompting them with questions about what they were doing, why, how, and what next, to attempt to understand their experiences. These sessions lasted from 30 to 60 minutes and were also audio-recorded. Think-aloud sessions were subsequently transcribed, including participants' comments and explanations. Transcripts, combined with our notes, gave us important insights about young people's uses of *MySpace*. We discovered what they do on a typical day within the space, their ordering of activities and the technical features of this communication technology that made it so appealing.

Third, we adapted Jones et al. (2008) content analysis protocol to code and analyze the actual content of students' *MySpace* profile pages. For instance, we documented the frequency and types of personal, identifying, and contact information they included (e.g., identification of real name, hometown, gender, sexual orientation, ethnicity, interests, and identifying image). We also examined their use of various technical features, such as their frequency of blog use (if applicable) and topics covered as well as the presence of various visual media (e.g., videos, photos, applications). We noted others' comments on their pages, including the number of comments, topics commented on, and total number of friends as well as their alterations to the design, look, and functionality of their profile pages. Some of these analyses were simple counts (e.g., number of friends, comments, or photos) that revealed which SNS features they used for what purposes.

Although we sought to adequately capture and describe students' experiences and demonstrated uses of MySpace.com, our study was not longitudinal, and therefore, presents only a detailed snapshot of practice during a limited period of time. Moreover, it is possible that students, in friending us for the purposes of the research study, actually altered their normal patterns of online behavior because they knew we were watching. For our part, we tried to minimize our impact on the online space we were studying by observing participants' behaviors but never posting, commenting, or otherwise indicating our presence as observers.

Next, we report the common themes that emerged from this analysis, organized into three sections with each section corresponding to one of our three research questions. Pseudonyms are used in place of actual names and supporting evidence from students' interviews, talk-alouds, and *MySpace* profiles is presented wherever possible.

Results

Students' views of SNSs for learning

As reported in student surveys conducted earlier, the low-income students in our study felt they learned technology skills, creativity, and communication skills in using *MySpace* (Greenhow et al. 2008); however, they saw little connection between their use of this social software and the knowledge and skills they believed their teachers valued in school. Interestingly, students identified several ways in which they used their SNS to vent about or get help on school-related issues or assignments. Many students commented that they would actually work on group projects using *MySpace* communication features, such as the bulletin board, or use their *MySpace* to organize

study groups: assigning tasks, checking progress, and clarifying teacher instructions while online. For instance, in the following excerpt, Mia explains how she used her social network to get emotional support and help with a school assignment:

I recently put up a bulletin saying that I didn't know how to finish my world lit paper. And then, I got comments back saying like: 'Just keep going through the nervous part.' And I asked about one of the books we had read because I didn't have the book with me and they [others in her network] wrote back and gave me the number, the quote, and the citation. So it was really helpful... It's really easy to get access to help... and also when you... just need encouragement, you can go to *MySpace* and see what other people are doing and maybe they're doing the same thing and you guys can discuss it and switch around ideas.

These and other examples from interview transcripts and profile pages suggest that students may be using *MySpace* outside of school to support formal content area learning, but do not necessarily recognize they are doing so.

When asked if their teachers or coaches within the college access program had a profile on *MySpace*, none of the students we interviewed had actually searched for this information to know. Students said they did not talk about their *MySpace* use with teachers or parents and that they felt teachers and parents largely viewed these sites as a waste of time or a distraction. Students were generally banned from using SNSs within school but they had discovered creative ways to work around the school's firewalls, accessing their *MySpace* through proxy servers. All students had the internet at home, used it to go online, and did not mention any objections from their parents to *MySpace*. Several students stated that they knew more about the internet than their parents did and saw their parents as generally not interested in computers.

Perhaps most important for these students from low-income families in a college access program is their observation that through *MySpace* they deepened relationships with people in their local and extended networks. Sons or daughters in immigrant families, especially, reported keeping in touch with distant friends and relatives through *MySpace*. Knowing how to cultivate and use a supportive network of people, information and resources may give SNS users, especially those experiencing low self-esteem, lack of social belonging, or lack of confidence, an advantage during major life transitions such as relocation or the transition to college (Ellison, Steinfield, and Lampe 2007).

Identity formation in SNSs

Next, we found that students used *MySpace* to perform 'identity work' online (Boyd 2007). Using social and technical features, they engaged in self-discovery and self-presentation within a semipublic context (e.g., all profiles were set to be viewed by 'friends only'). Interestingly, the selves they portrayed in their *MySpace* profiles seemed only slightly embellished rather than deceptive or false as others have suggested (Boyd 2006; Erard 2003).

For instance, students' profiles revealed a good deal of accurate personal and identifying information. Because we had met each student, knew what they looked like, where they lived, attended school, and other demographic information, we could check what we knew against what they portrayed within *MySpace*. In all cases, students had added us to their 'Friendlist' temporarily so that we could login, and through our own profile, observe those of our participants. Content analysis indicated

that students generally revealed their actual age, gender, home state, relationship status (i.e., single, in a relationship, or engaged), educational status, and purpose in using *MySpace* (e.g., students indicated ‘I’m here for “friends” or “friends and networking”’). *MySpace* users must choose to reveal much of this information, but some information, such as ‘gender,’ is collected when they sign up and displayed automatically on their profile. The majority (7 out of 11 participants) revealed their first and last name somewhere within their *MySpace*. However, most only used their first name, or part of their first and last name, in their screen name. For instance, ‘Joe Smith’ might appear as ‘Joe’ or ‘JoeS’ or ‘Joeman.’ One student used her first and last initials as her screen name, and four students invented an online handle such as ‘flowergirl.’ In addition, 9 out of 11 participants had posted an identifying image or photograph on their profile. Seven used a self-portrait. Three appeared in a photograph with a friend or partner. Of the two students who chose not to post an image of themselves, one posted an environmental picture (e.g., a beach scene), and another chose a photograph that depicted people working together. Seven out of eleven participants revealed the name of their hometown.

Most students in our study did not disclose: their email, birth date, cell phone or telephone, postal address, occupation, income, and religion. Sexual orientation was listed by 50% of students; body type was stated in only four cases (e.g., slim/slender or height such as 5’3”). Ethnicity was declared in 4 out of 11 cases, although other aspects of the profile, such as identifying image, choice of music, hobbies, groups, or interests, were suggestive. Although we saw a few cases of outright identity fabrication, such as the student who listed his body type as ‘00’ or the girl who claimed she was 23 when we knew otherwise, overall, we were surprised by the apparent truthfulness of these accounts. It may be that most of our subjects sought to communicate with an audience that on some level, they already knew; therefore, the motivation to engage in outright deception was low (Donath and Boyd 2004).

With these text and images, students used *MySpace* to depict physical, relational, and educational aspects of themselves but declined to reveal, or only hinted at, their sexual, ethnic, or occupational dimensions. We were especially surprised, given that students were identified through an after school college access program and had been accepted to college by the time we conducted this study, that only four participants listed the college they would be enrolling in next year on their profile. Those who displayed this information also indicated what degree and/or major they intended to pursue. This was surprising to us given the program’s emphasis on celebrating successes and being a leader and role model to the next generation of students. In fact, only one student mentioned using her online social network explicitly to make her college search and enrollment process transparent for younger *MySpace* users. This student also discussed how she used *MySpace* to actually network with undergraduates at the colleges she was interested in and to meet established artists to learn about career options. She believed that her online interactions through *MySpace* with people she had never met actually helped her make her college decision. Hers was the only clear case of students’ using *MySpace* for career-related networking, self-promotion, and advancement.

In the teenage years, students are working to define who they are at any given moment and who they are becoming. This is often a struggle as one must navigate an evolving sense of self within a broader social context that rewards and punishes self-disclosure. We saw participants’ quest for self-discovery, identity exploration, and

self-presentation playing out within their *MySpace* profiles. As Kim's comment below suggests, students used *MySpace* to work through internal dilemmas about who they are or think they are, and who they should be:

When I feel kind of kid-ish I will put on pastel looking [*MySpace*] backgrounds or if I feel like serious than I put on black backgrounds but I must remain feminine, so what I have right now is a black background with pink flowers.

In this quote, Kim talks about being her serious and feminine selves simultaneously. She uses customizable *MySpace* backgrounds, like clothing on a virtual body, to discern and portray what she is experiencing (i.e., kid-ish or serious). At the same time, she is considering in her selection of color, design, and graphics, the self she needs to portray: 'I must remain feminine.' Her solution: 'a black background with pink flowers' is perhaps a compromise between self-revelation and conformity to what she feels is expected.

Another participant, Tiffany, talks about self-discovery while developing a *MySpace* profile with her sisters: 'All of us use it [*MySpace* account] so it's kind of a way for us to input and find out information about all of our selves and show what we do.' Here, Tiffany discusses using *MySpace* to find out about 'all of our selves,' exploring her roles as an individual, as a sister, and as a member of her family as well as learning about her sisters while she distinguishes herself from them: 'show what we do' as individuals.

We observed students exploring and portraying different aspects of themselves through their use of text and non-text media. In analyzing students' profiles, we found that each profile background and layout was unique. Like fingerprints, no two subjects had the same combination of colors, graphics, layouts, media features, and applications displayed on their page. No subjects accepted *MySpace* default background as their own, and all commented that they regularly changed the 'look and feel' of their *MySpace*. We saw evidence of this in observing their profile one day and then, when we logged in days later, it had changed. Moreover, students frequently changed their *MySpace* 'status,' 'mood,' and 'updates,' indicating their emotions, selecting an accompanying emoticon, and writing a phrase or two about life events or future plans. The short excerpt below from a blog entry is another example of students' using *MySpace* for self-discovery and reflection. In this passage, titled 'Is it me' and categorized 'Life,' the author reflects on what it means to be a friend and to have friendships in relation to being 'just me:'

Is it me

Category: Life

Is it just me or is everyone just better off thinking that everyone is fine? I mean I would rather know about my friends problems than try to pretend that everything is all good in their lives. Maybe this is just me. I am just really like wondering to myself if it is that I 'pry' too much in the lives of my friends to try to understand them better? I mean I don't know, maybe the people that I surround myself with just aren't the right people. Or maybe I am just stuck in this like down and out stage. I guess I just wish that I would have people that were more... well, just better at being friends.

About half of participants used the blogging feature within *MySpace*, and of those bloggers, most posted monthly or bimonthly on a range of topics (e.g., relationships, friends, school, feelings, etc.) and in a variety of genres (e.g., poetry, song lyrics, prose, lists, answers to survey questions circulated within *MySpace*).

Moreover, as the examples above suggest, students also used *MySpace* to present themselves and get feedback. The blogger in the above example is not only reflecting on the tensions he feels between self and relationships, but inviting feedback, which he gets in the form of ‘comments’ and ‘kudos’ posted by ‘friends’ in response to this entry. One participant, Brandy, told us that she felt *MySpace* enabled people to portray ‘different sides’ of their identity that would otherwise remain masked:

You can share different sides of yourself that you would never do otherwise. It just gives people ever more opportunity to be who they are... and to know who you are... your interest in poetry, music, photographs they might not have known otherwise.

Others have written about the affordances and limitations of online environments where social cues and identity indicators, present in the physical world, are absent; this can lower people’s inhibitions, and they reveal more ‘sides’ of themselves through text and other media (Donath and Boyd 2004; Dwyer 2007; Gallant, Boone, and Heap 2007). However, we were most interested in comments such as Brandy’s that suggested not only are students using *MySpace* for self-discovery, personal expression, and self-presentation, but also to clarify, showcase, and develop their interests and abilities within a network that values invention and sharing. Mia described it this way:

I learn different things [on *MySpace*] like just with the presidential election and learning about college and everything. People do use it [*MySpace*] for more than just flirting with boys or with girls. If people really have an interest they want to express or promote, then they use those networks. It’s the same as being in school. If they have an interest in doing more than flirting, if they have an interest in learning about different things, they establish that situation for themselves.

Indeed, students discussed how their *MySpace* profile – and their network – changed with them: ‘Every day things happen... you log in there is new experience you are going to see a different person... it is just different aspects of that person and what happened to them that day. Basically, they grow.’

MySpace seemed to encourage identity formation and interest growth among these young users through its dynamically updating, Web-based media-sharing features. For instance, participants emphasized the importance of continuously displaying photographs within *MySpace* to introduce, contextualize, and ‘talk’ about who they are, as Ned explains in commenting about the kinds of pictures he incorporates into his profile: ‘Pictures of what I like, pictures that are memories that we share over the years and use it to talk about who you are, use it to express who you are.’ Similarly, Bobbie described how she used photographs on the profile page of a new ‘Friend’ to interpret and understand the person: ‘I go through their pictures first to see who they are.’ *MySpace* allows users to create public or private albums with the ‘My Photos’ feature. Through My Photos, images can be uploaded, captioned, edited, tagged, and shared. Original images or those ‘found’ on the internet also become part of one’s background or wallpaper on the main profile page.

Participants also presented an online identity through customizable backgrounds and layouts, as Ned commented when talking about the purpose of the background image: ‘It tells who you are.’ Kim reacted negatively to the profile background her friend had created for her: ‘I didn’t like the background, and I didn’t feel it reflected

who I was. It was more anime-ish and fantasy-like, and I am a more realistic person.’ Kim rejected the profile her friend had crafted and built her own page, one she felt was more representative.

Music was also an important aspect of identity expression and self-presentation on *MySpace*. Nine out of eleven profiles had music playing in their background. Katherine explained how she learned about her friends through their music: ‘It’s kinda good to go on other people’s pages and see what kind of songs they have... because again it tells a lot about who they are, and what they like to do.’ Mia explained that songs were updated frequently on her profile to reflect her state of being: ‘I would change my song, because to me personally, it expresses how I feel at that time or that day or whatever.’

Gallant, Boone, and Heap argue that the best online communities encourage ‘identity posting’ (2007, 6). They suggest self-expression and identity performance are encouraged in SNSs through technical aspects that provide ‘personalizing features and activities to satisfy people’s need to develop individual style and create a social statement’ (Gallant, Boone, and Heap 2007, 7). These include: different communication strategies to fit individual preferences (e.g., asynchronous and synchronous), interactive creativity (e.g., design flexibility in one’s profile page background and layout), selective hierarchy (e.g., joining different groups or keeping out members), identity posting (e.g., online biographies through photos, video, blogs, comments, status, and mood updates), and artistic forms (e.g., video posts, remixing of media, creative use of music). Gallant, Boone, and Heap (2007) point to creative use of video and music as well as the mixing of media as elements of the user interface important to identity formation and sociality.

Demonstration of twenty-first century competencies

In examining the kinds of twenty-first century learning students demonstrate, if any, within their SNS, we focused in this paper on technological fluency and digital citizenship. Our purpose was to explore what students had revealed in an earlier survey (Greenhow, Walker, et al. 2008). The two sections that follow describe how these competencies were demonstrated or not within students’ SNSs.

Technological fluency

The ability to use technology applications and systems, including troubleshooting and transferring skills to new situations as they occur, is important for learning in all domains. In all cases, students believed they were developing technological fluency in using *MySpace*, although this varied according to their intensity of use, with the more intense *MySpace* users feeling most strongly that *MySpace* developed their fluency (Greenhow, Robelia, et al. 2008).

In talking with participants and viewing *MySpace* accounts in-depth, we learned that simply participating in the SNS to the extent they did required knowledge of a range of information and communication technologies, including: the ability to search out, preview, select, incorporate, and share audio and video files; the ability to create, edit, copy, find, upload, tag, and arrange image files; the capacity to strategically monitor, respond, multitask, and navigate multiple communication channels (e.g., instant messaging, *MySpace* email, wall posts, blog comments, tagged photos, video-shares, etc.), and more.

Students appeared to learn these skills informally but also non-formally when they apprenticed themselves to more experienced users. In fact, many of the students said they were introduced to *MySpace* through people they knew who used it, although they also relied on *MySpace* forums or related online groups to continue learning. Typically, participants created initial profiles with help from those who understood the ‘construction of cool’ (Boyd 2007), that is, how to stylize Web pages with interesting backgrounds, layouts, and interactive features. Brandy, for instance, explained how her technical competence developed with the help of *MySpace* ‘friends:’

I have friends that go and download an MP3 file and they’ll format it so it will work on my page. And they have kind of shown me how to do that now so that I don’t always have to call them over or message them when I want this song or some help... I know I’m learning more how to upload and work with different files, change different things... and that’s something I probably wouldn’t have done if I weren’t using *MySpace*.

In addition to working with images, audio files, and videos, *MySpace* facilitates Web page design flexibility and customization. Users with an interest in stylizing their pages can enter HTML code to do so. Tiffany explains how she learned to manipulate HTML as a *MySpace* apprentice and soon became an expert, ‘My sister was the one who kind of learned it first, and then I kind of learned from her. And now I know more than her... I showed my cousin how to do it and my sisters.’ Andrea also learned about HTML and how to alter source codes for different effects through *MySpace* activities, ‘I learned more about HTML... with the whole editing and that thing. So I have to ask my friends for help to try to get something this color... I then learn a little more.’ As these comments suggest, participants were motivated to learn different applications, and the technical skills they needed, to craft expressive profiles that characterize participation in their *MySpace* community. In discussing the dynamics of a learning ecology, Barron (2006) suggests that developing one’s ‘islands of expertise’ in informal learning contexts is important to seeding a sense of oneself as knowledgeable (198). Through the cognitive activity of guiding other *MySpace* users in learning how to manipulate, troubleshoot, and transfer technology skills from one application to another, students are simultaneously developing their own conceptual knowledge and sense of competency.

In some cases, formal and informal learning opportunities for developing technological fluency were symbiotic. Several students talked about being introduced to technology applications in school (e.g., video production or graphic art class) and then building on and extending what they had learned through interest-driven activities within *MySpace*. For example, one student, who was interested in video production, had learned to use related software programs in high school. He built on these skills when he wanted to promote a local sports team. Creating a video of highlights from a winning game, which he then posted on *YouTube*, he shared this video with his *MySpace* network and encouraged his friends to check out future games offline. Of all the cases in this study, this student demonstrated the most creative uses of video on his site, uploading clips he had created or found on the Internet.

Digital citizenship

As students increasingly experiment with identity issues online, evolving a virtual self to participate in SNSs or other Web-based communities, they must develop their

capacity for *digital citizenship*, or online behavior that demonstrates legal, ethical, safe, and responsible uses of information and communication technologies. Students in our study demonstrated some evidence of digital citizenship, but their understanding of this concept or sense of why it was important was not well developed.

For instance, students could advise us on how to be a good *MySpace* member, recalling aspects of the *MySpace* user agreement or describing unwritten codes of conduct, but their rationale for these was ill-formed. Of the elements of digital citizenship described in the ISTE standards, students displayed the most awareness of *safety* issues. Most participants could describe how *MySpace* privacy settings functioned and had set their profile to be viewed by ‘friends’ only. A few students believed their site was configured so that anyone could view it, but they also described the risks associated with this behavior. In this excerpt, Katherine explains how participating in *MySpace* actually helped her think about safety and privacy online:

The first time you’re working *MySpace*, you don’t really know what you’re doing, and so you don’t know what to keep private and what to block off. And I think that’s the hardest part for me, like, when I first started, I didn’t know how to block my pages... so random people would see my pages, and... when, like, people I didn’t know kept trying to be my friend, I think that’s when I finally realized that, okay there’s, there has to be some way I can block it off... I had a friend who helped me put in this code that would block off my page, and only friends that I saved can see my page.

In addition, students demonstrated *responsible* uses of technology within *MySpace* by respectfully responding to others’ bulletin requests for information and aiding other users in resolving technical problems. They advocated for appropriate uses of *MySpace* by publicly sanctioning those who posted rumors or racist comments, although several commented that they would not openly criticize the behaviors of others they did not really know.

Moreover, they hardly mentioned and seemed only vaguely aware of the public discourse surrounding the potential legal and ethical issues involved when young people use online SNSs, nor were they concerned that their own behaviors may not comply with acceptable use standards. Such ill-formed and only partial understandings of their rights and responsibilities in semipublic online spaces, especially with respect to legal issues of copyright and fair use, mirror the lack of understanding on the part of educators who are supposed to model digital citizenship behaviors (Greenhow et al. 2007).

Discussion

Students today are increasingly expected to develop technological fluency, digital citizenship, and other twenty-first century competencies despite wide variability in the quality of learning opportunities schools provide. SNSs available via the Internet may provide promising informal and non-formal contexts for learning to supplement school-based experiences. In this paper, we presented findings from a qualitative study that examined how urban high school students from low-income families used the SNS, *MySpace*, to engage in self-discovery, self-presentation, and identity formation. Students used various socio-technical features such as photo-sharing, graphic design, and multiple communication channels within *MySpace* to convey who they were at a given moment and to learn about the changing lives of others in the network. While engaging in identity work, students were also gaining technological fluency and beginning to consider their roles and responsibilities as digital citizens.

Next we offer two reflections on how such technologies might be incorporated into the students' overall learning ecology to reduce educational inequities and how current institutionalized approaches might shift to accommodate such change. First, given the increasing prevalence of online networking opportunities and the fact that networked architectures are transforming college recruiting, hiring practices, and civic participation in the USA (Rosenbloom 2008; Sheehy 2008), educators must help students enact legal, ethical, responsible, safe, and advantageous online community practices. In our teacher education classes, new and old teachers alike often assume (incorrectly) that most urban youth in our area do not have internet access at home. Survey research with over 1300 low-income urban youth in the Midwestern USA (Greenhow et al. 2008) and similar national reports of teens and families suggest that this is simply not the case. Perhaps one shift we need to make, then, is in our expectations. If we begin by expecting that our students will be online as part of their daily lives, and engaged in multimedia communication, then teaching them how to act to their advantage within physical and cyberspace networks becomes less optional and more imperative. Our findings reveal that social software's advantages for academic and career networking are not as clear to students who perhaps most need them as they could be. Familiarizing ourselves with these tools, and how they are being used positively in other fields, will enable us to create rich 'transactional spaces' (Erstad, Gilje, and de Lange 2007) wherein students and teachers can jointly negotiate their sense of competency around twenty-first century skills. We envision these spaces as extending across the learning ecology rather than confined within limited time frames, freedoms, and resources that typically characterize school.

Second, we need research efforts that illuminate how the Web-based communication and network visualization tools found in today's social software can shape content area learning and social practices, and how these, in turn suggest new learning and teaching theories. Technology executives predict the coming wave of social networking, 'social operating systems,' which will move us away from restricting users to walled-off membership in a few sites (e.g., *Facebook*) towards a more open and flexible sharing between numerous niche communities (NMC 2008). These social operating systems will enable students, teachers, and researchers to make visible their 'social graph,' or the network of people they know, are related to, or work with independent of any given address book or networking system. Such tools may be especially useful for helping students develop domain knowledge and become inducted into the practices that characterize their field of study, as this example from the *Horizon Report* illustrates:

Students working on research papers often do not fully realize what it means to be a scholar. Of the network of activities that scholars are involved in – writing, researching, interacting with peers and colleagues, presenting at conferences – only a small part is apparent to a student doing research. Every idea, paper, experiment, and artifact is, in reality, attached to a person or group of people who helped bring it about. Imagine the impact of tools that place those people and relationships at the center of any research inquiry: concepts clearly linked to people; connections between those people and others clearly indicated; a much more complete picture of the topic would emerge, more quickly than is possible with current tools. (NMC 2008, 26)

Such developments in social software may help to address educational inequities by providing a freely accessible means for all learners to engage in interest development, self-publication, and promotion. However, restrictive school policies, existing disconnects between in- and out-of-school learning, and classical views of knowledge pose

considerable challenges. We look to our colleagues to join us in advancing the conversation.

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References

- Barnes, S.B. 2006. A privacy paradox: Social networking in the United States. *First Monday* 11, no. 9. http://www.firstmonday.org/issues/issue11_9/barnes/ (accessed August 12, 2008).
- Barron, B. 2006. Interest and self-sustained learning as catalysts of development: A learning ecologies perspective. *Human Development* 49: 193–224.
- Bentivegna, S. 2002. Politics and new media. In *Handbook of new media*, ed. L. Lievrouw and S. Livingstone, 50–61. London: Sage.
- Bentivegna, S. 2006. Rethinking politics in the world of ICTs. *European Journal of Communication* 21: 331–43.
- Boyd, D. 2006. Friends, friendsters, and top 8: Writing community into being on social network sites. *First Monday* 11, no. 12 (December). http://www.firstmonday.org/issues/issue11_12/boyd/ (accessed October 15, 2008).
- Boyd, D. 2007. Why youth ♥ social network sites: The role of networked publics in teenage social life. In *The John D. and Catherine T. MacArthur Foundation series on digital media and learning: Youth, identity and digital media*, ed. D. Buckingham, 119–42. Cambridge: The MIT Press. <http://www.mitpressjournals.org/toc/dmal/-/6>
- Boyd, D., and N. Ellison. 2007. Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication* 13, no. 1 (article 11). <http://www.jcmc.indiana.edu/vol13/issue1/boyd.ellison.html> (accessed October 15, 2008).
- Buckingham, D. 2007. Introducing identity. In *The John D. and Catherine T. MacArthur Foundation series on digital media and learning: Youth, identity and digital media*, ed. D. Buckingham, 1–24. Cambridge: The MIT Press. <http://www.mitpressjournals.org/doi/pdf/10.1162/dmal.9780262524834.001>
- Bull, G., A. Thompon, M. Searson, J. Garofalo, J. Park, C. Young, and J. Lee. 2008. Connecting informal and formal learning: Experiences in the age of participatory media. *Contemporary Issues in Technology and Teacher Education* 8, no. 2. <http://citejournal.org/vol8/iss2/editorial/article1.cfm> (accessed July 1, 2008).
- Butler, J. 1990. *Gender trouble*. New York: Routledge.
- Childnet International. 2007. *Young people and social networking services: A Childnet International research report*. <http://www.digizen.org/socialnetworking> (accessed September 25, 2008).

- Clark, D.A. 1997. Twenty years of cognitive assessment: Current status and future directions. *Journal of Consulting and Clinical Psychology* 65: 996–1000.
- Coiro, J., M. Knobel, C. Lankshear, and D. Leu. 2008. Central issues in new literacies and new literacies research. In *Handbook of research on new literacies*, ed. J. Coiro, M. Knobel, C. Lankshear, and D.J. Leu, 1–21. New York: Lawrence Erlbaum.
- Cole, M. 1996. *Cultural psychology: A once and future discipline*. Cambridge: Harvard University Press.
- DeGennaro, D. 2008. Learning designs: An analysis of youth-initiated technology use. *Journal of Research on Technology in Education* 4, no. 1: 1–20.
- Denzin, N.K., and Y.S. Lincoln, eds. 1994. *Handbook of qualitative research*. Thousand Oaks, CA: Sage.
- Donath, J., and D. Boyd. 2004. Public displays of connection. *BT Technology Journal* 22: 71–82.
- Douglas-Hall, A., M. Chau, and H. Koball. 2006. *Basic facts about low-income children: Birth to age 18*. New York: National Center for Children in Poverty.
- Dwyer, C., 2007. Digital relationships in the 'MySpace' generation: Results from a qualitative study. In the Proceedings of the 40th Annual Hawaii International Conference on System Sciences (HICSS), 3–6 January, in Waikoloa, Hawaii.
- Ellison, N., C. Steinfeld, and C. Lampe. 2007. The benefits of Facebook 'friends': Exploring the relationship between college students' use of online social networks and social capital. *Journal of Computer-Mediated Communication* 12, no. 3 (article 1). <http://jcmc.indiana.edu/vol12/issue4/ellison.html> (accessed July 30, 2008).
- Engestrom, Y. 1987. *Learning by expanding: An activity-theoretical approach to developmental research*. Helsinki: Orienta-Konsultit Oy.
- Erard, M. 2003. Decoding the new cues in online society. *New York Times*, November 27.
- Erikson, E. 1968. *Identity, youth and crisis*. New York: W.W. Norton.
- Erstad, O., O. Gilje, and T. de Lange. 2007. Re-mixing multimodal resources: Multiliteracies and digital production in Norwegian media education. *Learning, Media and Technology* 32, no. 2: 183–98.
- Gallant, L.M., G.M. Boone, and A. Heap. 2007. Five heuristics for designing and evaluating web-based communities. *First Monday* 12, no. 3. http://firstmonday.org/issues/issue12_3/gallant/ (accessed October 15, 2008).
- Goffman, E. 1959. *The presentation of self in everyday life*. New York: Anchor.
- Gratton, L. 2007. *Hot spots: Why some teams, workplaces, and organizations buzz with energy – and others don't*. San Francisco: Berrett-Koehler.
- Greenhow, C. 2008. Connecting informal and formal learning experiences in the age of participatory media: Commentary on Bull et al. (2008). *Contemporary Issues in Technology and Teacher Education* 8, no. 3: 187–94.
- Greenhow, C., B. Robelia, and J. Hughes. 2009. Learning, teaching, and scholarship in a digital age: Web 2.0 and classroom research: What path should we take now? *Educational Researcher* 38, no. 4: 233–45.
- Greenhow, C., B. Robelia, and S. Kim. 2008. Examining the intersections of online social networks, pedagogy, and engagement among low-income students. Paper presented at the American Educational Research Association, March 24–28, in New York.
- Greenhow, C., J. Walker, D. Donnelly, and B. Cohen. 2007. Fair use education for the twenty-first century: A comparative study of students' use of an interactive tool to guide decision making. *Innovate* 4, no. 2. <http://www.innovateonline.info/index.php?view=article&id=443> (accessed April 24, 2008).
- Greenhow, C., J.D. Walker, and S. Kim. 2008. Millennial learners and net-savvy teens: Examining internet use among low-income students. Paper presented at the American Educational Research Association, March 24–28, in New York.
- Greeno, J. 1989. The situativity of knowing, learning, and research. *American Psychologist* 53: 5–26.
- Hargittai, E. 2007. Whose space? Differences among users and non-users of social network sites. *Journal of Computer-Mediated Communication* 13, no. 1 (article 14). <http://jcmc.indiana.edu/vol13/issue1/hargittai.html> (accessed September 29, 2008).
- Haythornthwaite, C. 2005. Social networks and internet connectivity effects. *Information, Communication, & Society* 8, no. 2: 125–47.

- Horton, F.W. 2006. UNESCO Report on media education: A kit for teachers, students, parents and professionals. http://portal.unesco.org/ci/en/ev.php-URL_ID=26594&URL_DO=DO_TOPIC&URL_SECTION=201.html (accessed November 9, 2008).
- ISTE. 2007. The ISTE National Educational Technology Standards (NETS-S) and performance indicators for students. http://www.iste.org/Content/NavigationMenu/NETS/ForStudents/2007Standards/NETS_for_Students_2007_Standards.pdf (accessed September 26, 2008).
- ISTE. 2008. The ISTE National Educational Technology Standards (NETS-T) for teachers. http://iste.org/Content/NavigationMenu/NETS/ForTeachers/2008Standards/NETS_for_Teachers_2008.htm (accessed February 16, 2009).
- Jenkins, H. 2006. Confronting the challenges of participatory culture: Media education for the 21st Century. White paper for the MacArthur Foundation. <http://www.digitalllearning.macfound.org> (accessed July 1, 2008).
- Jones, S., S. Millermaier, M. Goya-Martinez, and J. Schuler. 2008. Whose space is MySpace? A content analysis of MySpace profiles. *First Monday* 13, no. 9. <http://www.uic.edu/htbin/cgiwrap/bin/ojs/index.php/fm/article/view/2202/2024> (accessed October 5, 2008).
- Kaiser Family Foundation. 2005. *Generation M: Media in the lives of 8–18 year olds*. Menlo Park, CA: Kaiser Family Foundation.
- Lenhart, A., and M. Madden. 2007. *Pew Internet Project Data Memo*. Washington, DC: Pew Charitable Trusts. http://www.pewinternet.org/pdfs/PIP_SNS_Data_Memo_Jan_2007.pdf (accessed September 29, 2008).
- Levin, D., S. Arafeh, A. Lenhart, and L. Rainie. 2002. *The digital disconnect: The widening gap between internet-savvy students and their schools*. Washington, DC: Pew Charitable Trust. http://www.pewinternet.org/PPF/r/67/report_display.asp (accessed October 1, 2008).
- Livingstone, S., and M. Bober. 2004. Taking up online opportunities? Children's uses of the internet for education, communication and participation. *e-Learning* 1, no. 3. http://www.wwwwords.co.uk/pdf/validate.asp?j=elea&vol=1&issue=3&year=2004&article=5_Livingstone_ELEA_1_3_web (accessed February 1, 2009).
- Livingstone, S., M. Bober, and E. Helsper. 2005. *Internet literacy among children and young people: Findings from the UK Children Go Online Project*. London: London School of Economics. <http://www.children-go-online.net> (accessed February 1, 2009).
- Livingstone, S., E. Van Couvering, and N. Thumin. 2008. Converging traditions of research on media and information literacies: Disciplinary, critical, and methodological issues. In *Handbook of research on new literacies*, ed. J. Coiro, M. Knobel, C. Lankshear, and D.J. Leu, 103–32. New York: Lawrence Erlbaum.
- Maxwell, J.A. 1996. *Qualitative research design: An interactive approach*. Thousand Oaks, CA: Sage.
- National Research Council. 1999. *Being fluent with information technology*. Washington, DC: National Academy Press.
- National School Boards Association. 2007. *Creating and connecting: Research and guidelines on social – and educational – networking*. <http://www.nsba.org/SecondaryMenu/TLN/CreatingandConnecting.aspx> (accessed March 28, 2008).
- NMC (New Media Consortium). 2008. *The horizon report*. Austin, TX: New Media Consortium. <http://www.nmc.org/pdf/2008-Horizon-Report.pdf> (accessed September 30, 2008).
- Norris, C., T. Sullivan, J. Poirrot, and E. Soloway. 2003. No access, no use, no impact: Snapshot surveys of educational technology in K-12. *Journal of Research on Technology in Education* 36, no. 1: 15–27.
- NSTA (National Science Teachers Association). 1999. Position statement on informal science education. In *Official positions*. <http://www.nsta.org/about/positions/informal.aspx> (accessed October 22, 2008).
- Partnership for 21st Century Skills. 2008. 21st Century skills, education & competitiveness: A resource and policy guide. http://www.21stcenturyskills.org/documents/21st_century_skills_education_and_competitiveness_guide.pdf (accessed September 30, 2008).
- Pepler, K.A., and Y.B. Kafai. 2007. From SuperGoo to Scratch: Exploring creative digital media production in informal learning. *Learning, Media and Technology* 32, no. 2: 149–66.
- Ribble, M.S., and G.D. Bailey. 2004. Digital citizenship: Focus questions for implementation. *Learning and Leading with Technology* 32, no. 2: 12–15.

- Ribble, M.S., G.D. Bailey, and T.W. Ross. 2004. Digital citizenship: Addressing appropriate technology behavior. *Learning and Leading with Technology* 32, no. 1: 6–11.
- Rosenbloom, S. 2008. Status: Looking for work on Facebook. *New York Times*, May 1.
- Sefton-Green, J. 2004. *Report 7: Literature review in informal learning with technology outside school*. Bristol: Futurelab. <http://www.futurelab.org.uk> (accessed October 15, 2008).
- Seidman, I. 1998. *Interviewing as qualitative research: A guide for researchers in education and social sciences*. 2nd ed. New York: Teachers College Press.
- Selwyn, N. 2007. *Report 3 update: Citizenship, technology and learning – a review of recent literature*. Bristol: Futurelab (LR3U). <http://www.futurelab.org.uk> (accessed February 5, 2009).
- Sheehy, G. 2008. Campaign Hillary: Behind closed doors. *Vanity Fair* (August): 79–86.
- Slater, D. 2002. Social relationships and identity online and offline. In *Handbook of new media*, ed. L. Lievrouw and S. Livingstone, 533–46. London: Sage.
- Spires, H.A., J.K. Lee, K.A. Turner, and J. Johnson. 2008. Having our say: Middle grade student perspectives on school, technologies, and academic engagement. *Journal of Research on Technology in Education* 40, no. 4: 497–515.
- Steinkuhler, C. 2008. Cognition and literacy in massively multiplayer online games. In *Handbook of research on new literacies*, ed. J. Coiro, M. Knobel, C. Lankshear, and D.J. Leu, 611–34. New York: Lawrence Erlbaum.
- Stern, S. 2007. Producing sites, exploring identities: Youth online authorship. In *The John D. and Catherine T. MacArthur Foundation series on digital media and learning: Youth, identity and digital media*, ed. D. Buckingham, 95–118. Cambridge: The MIT Press. <http://www.mitpressjournals.org/toc/dmal/-/6?cookieSet=1> (accessed October 3, 2008).
- Stone, B. 2007. Social networking's next phase. *New York Times*, March 3.
- UNESCO. 2008. Understanding information literacy: A primer. http://portal.unesco.org/ci/en/ev.php-URL_ID=25956&URL_DO=DO_TOPIC&URL_SECTION=201.html (accessed November 9, 2008).
- Vygotsky, L.S. 1978. *Mind in society: The development of higher psychological processes*. Cambridge: Harvard University Press.
- Williams, A., and M. Merten. 2008. A review of online social networking profiles by adolescents: Implications for future research and intervention. *Adolescence* 43: 253–74.

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