

The Importance of Still Teaching the iGeneration: New Technologies and the Centrality of Pedagogy

THOMAS M. PHILIP

*Graduate School of Education and Information Studies,
University of California, Los Angeles*

ANTERO D. GARCIA

Department of English, Colorado State University

In this essay, Philip and Garcia argue that visions of mobile devices in the classroom often draw on assumptions about the inherent interests youth have in these devices, the capability of these interests to transfer from out-of-school contexts to the classroom, and the capacity for these new technologies to equalize the educational playing field. These overly optimistic portrayals minimize the pivotal value of effective teaching and are implicitly or explicitly coupled with political agendas that attempt to increasingly control and regiment the work of teachers. Through discussing student interest and issues of educational technology in urban schools and highlighting the affordances and limitations of the texts, tools, and talk that teachers might facilitate with these devices, the authors offer a teacher-focused perspective that is sorely missing in the contemporary debates about using mobile technologies in schools.

The anticipation had been brewing. Students knew they were about to receive brand-new Android smartphones. And for school! The moment they had them in their hands, their thumbs moved rapidly as they raced to figure out the phones' features. The teacher perfunctorily went through the PowerPoint on how to use the phones, the students correcting him on the instructions they found largely irrelevant. The scene of students enthusiastically engaged with mobile phones and clumsily guided by a "relic" of the predigital age perfectly fit Prensky's (2006) popular narrative of "digital natives" and Rosen, Carrier, and Cheever's (2010) trendy image of technologically sophisticated and multi-tasking iGen teens. However, these romantic portraits of youth "fully engaged

by 21st century digital lives” (Prensky, 2006, p. 9) began to blur as soon as the bytes hit the airwaves.

In our work as former urban high school teachers and current teacher educators, and as educational researchers who are collaborating on a project that uses mobile phones to teach about computational thinking and data science in urban high schools, we have seen this image repeat itself time and again. The idea is always a simple one: technological devices, particularly smartphones, offer individualized learning opportunities. More importantly, kids think that the devices are cool. However, transferring the capabilities and coolness of youth-endorsed devices into classroom learning is not as simple as handing them out and turning them on. In fact, what we see is quite the contrary. In one particularly striking pattern from our current study, many kids tucked their school-issued phones away in lockers and tuned out as they became frustrated with the limitations of the devices, such as restrictions on texting, calling, and Web access, and their perceived liability if the phones were lost or stolen. Most students showed little to no interest in completing their homework, even though it was assigned on their shiny new devices. They explained that it was a hassle to carry around *their* phone and the *other* phone. Students also conjectured that they might be more inclined to use the school phone if “it had more privileges.” The phones came and went. The challenges of improving learning in these urban schools remained the same.

The persistent allure of technology as an easy remedy for educational issues of equity and achievement is intricately tied to naive assumptions about student interest and the possibility and desirability of “teacher-proof” (Scherer, 2012) classrooms. Like the fancy devices that came before them, the smartphone as a quick fix to educational issues is not only a problematic understanding of this device but a dangerous one. The narrative of inherent student interest in technology, augmented by the unsubstantiated paranoia over the last three decades about the dramatic deterioration of public schools (Rothstein, 1993), has resulted in counterproductive measures that attempt to routinize and control the work of teachers. Technology has been central in this campaign.

Technology has been proffered as a tool that can ensure that teachers teach students the *right* way. Such innovations are rooted in underlying assumptions that reduce teaching to discrete sets of knowledge and tasks that can presumably be better delivered and assessed by technology. For instance, Accelerated Reader scrutinizes whether students have read books (and teachers have gotten them to do so) by asking basic comprehension questions about the texts, while Khan Academy follows in a long line of technological innovations that have attempted to capture and mass distribute good teaching (Cuban, 1986). While Khan Academy and similar manifestations work to teacher-proof teaching, the variants of Accelerated Reader attempt to control and routinize the work of teachers.

Within the past decade, the ubiquity of e-mail, YouTube, social networks, tablets, and smartphones has changed the ways in which Americans interact,

share information, and consume and produce media. These are cultural shifts that are as subtle as Twitter hashtags appearing at the bottom of primetime television shows or in-the-moment, turn-by-turn driving directions. Innovation in schools, however, has focused more on the capabilities of singular devices rather than holistic engagement with cultural shifts inside and outside of classrooms.

These changes in person-to-person interaction, and in particular the pedagogical implications of mediating social relationships through new technologies, are rarely at the center of the most prevalent adoptions of educational technologies. For instance, Cuban (2012) highlights how assertions about improved tests scores, student motivation, the equalization of learning opportunities, and the transformation of traditional teaching prompted a school board's authorization to provide iPads to all kindergarten students in Auburn, Maine, and encouraged a district superintendent to issue these devices to all high school students and teachers in Lexington, South Carolina. Crucial decisions about critical resources are made on emphatic but empty promises that are not supported by a research base. Regrettably, these examples are the norm rather than the exception, as unsubstantiated assurances that a device's capability will transfer from a commercial, scientific, or industrial context to the classroom, rather than a candid assessment of its potential and limitations in facilitating rich learning, drive educational decisions from the national level down.

In our work as educational researchers, asking for clarity on *how* the use of technology will improve learning in a particular context is mostly met with the seemingly obvious fact that it will make learning relevant and will engage and motivate youth. The fascination with technology and its ostensibly inherent qualities of relevance, motivation, and engagement for youth almost always preclude any possibility of digging deeper.

In this article we argue for a more cautious and deliberate approach to educational technologies that attends to the work of teachers. By highlighting the particular ways in which new technologies are pushed into urban schools, we attempt to move beyond the mania of clicking, tapping, and texting as quick-fix solutions to America's legacy of "educational debt" (Ladson-Billings, 2006). While we agree with the thrust of the argument made by Prensky (2006) and Rosen and colleagues (2010), that schools must be more responsive to the possibilities afforded by new technologies and that the very structures of schools and classrooms must transform to truly leverage these capabilities, we are critical of the tendency to assume that technology will fantastically solve the intricate problems of schooling.

We intend for this essay to encourage reflective dialogue and generative steps in innovative curricular and learning projects that incorporate new mobile technologies. Novel use of technology in learning often prompts collaborations between educators and researchers from diverse disciplinary backgrounds and with varying levels of classroom experience and involvement. To

push for more clarity about how teaching and learning are conceptualized and engaged as these groups envision, develop, and implement innovative curricula with mobile technologies, we work at the intersection of relevant research and practice-based concerns. Throughout this essay, we analyze scholarship on teaching and learning to suggest some fundamental questions for teachers to reflect on when engaging new technologies in their classrooms. We trust that this approach will help surface and address the institutional and everyday tensions and nuances of teaching and learning that are often obscured in projects that attempt to integrate mobile technologies in the classroom.

Recognizing the Possibilities

There are a number of reasons why mobile devices appear to be a natural fit for engaging students in learning. They are increasingly ubiquitous and introduce previously unimaginable possibilities into the classroom space, and youth perform a wide range of tasks with them outside of school. They are also distinct from many prior technologies in that they are typically brought into school spaces by students themselves. Because smartphones are intimately tied to today's youth popular culture and are "personal, portable, and pedestrian" (Ito, Okabe, & Matsuda, 2005), they appear to offer a particularly productive opportunity for student buy-in.

Kolb (2008) describes the learning potential of smartphones as moving from "toys to tools." In Kolb's description of her own work, she argues that whole new worlds can be opened up if students begin to think about their mobile devices as "anytime, anywhere, Swiss Army knife-type data-collection tools" (Snider, 2008, para. 3). She adds, "If their phones work so well for them outside the classroom, we need to get them thinking about bringing these tech tools inside and putting them to good use." Similarly, So, Seow, and Looi (2009) point out the many advantages that smartphones offer over other "desktop-based knowledge building tools" (p. 367). They support unique forms of one-to-one access, learning in context, and seamless integration of formal and informal learning spaces. The portability and connectivity of the devices allow for "real-time data gathering and analysis with little time delay," which enables students to "constantly redefine their own goals" as learners (So et al., 2009, p. 370). Discussions about the integration of new technologies in the classroom highlight the potential for these devices to increase access to and ownership of learning, facilitate collaborative discourse among a community of learners, and promote a "pedagogical shift from didactic teacher-centered to participatory student-centered learning" (Looi et al., 2010, p. 156).

Exploring the historical relationships among technology, industry, learning, schooling, and the economy, Collins and Halverson (2010) argue that rapidly changing digital technologies have forced an unprecedented second revolution in schooling, that the current school system "organized around age-grading, traditional curricular sequencing, accepted professional accredi-

tation and long-standing funding models” grew out of the “technologies and social practices of the industrial revolution” and has struggled to adequately adapt to “new, learner-directed technologies” (p. 18). Just as the Industrial Revolution forced a shift from an apprenticeship model of learning to universal schooling, these authors contend that the information technology revolution is poised to redefine schooling and learning in fundamental ways. They capture some of these brewing shifts in their claim that learning must transform from uniformity, the “teacher as expert,” and “knowledge in the head” to customization, “diverse knowledge sources,” and the “reliance on outside resources.” The very culture of schools, they contend, is primed to change from being centered at particular physical spaces where age-based classes are taught and tested by authority figures to being distributed across multiple locations where mixed-age groups experience embedded assessments through computer-mediated interactions.

Kolb (2008), So and colleagues (2009), Looi and colleagues (2010), and Collins and Halverson (2010) all offer powerful visions for learning in the new mobile age. However, the focus on individual learners and communication mediated by mobile technologies has intentionally or inadvertently obscured the role of teachers, in some cases even suggesting that they are irrelevant to the future of learning. We argue that such interpretations are gross underestimations of the facilitative and instructional work of teachers. We explore how powerful teaching and pedagogy become even more vital within learning contexts that rely heavily on mobile technologies.

The iGen Discourse: An Ideology that Undermines Teachers and Pedagogy

While it is important to recognize the heterogeneity in how researchers and practitioners are advocating for the use of mobile learning technologies, we see a tendency for many of us to fall into the problematic trappings of extremely popular and influential positions such as Rosen and colleagues’ (2010). Perspectives such as theirs gloss over the ways in which technologies gain meaning and exist in relationship to other ideologies that challenge or reinscribe relationships of power within contested social, political, and economic terrains (Hall, 1996). As Winner (1986) and Feenberg (1991) remind us, the design of technologies and how we orient our bodies and labor to these devices all reflect the deliberate intentions and the unexamined ideological common sense of the gadgets’ creators and the societies in which they are used. A powerful example of these relations is Shor’s (1987) illustration of how even school desks and chairs, perhaps the most basic of “devices” in a classroom, shape processes of control and power.

The meaning of a technological tool never exists in isolation. As Hall (1996) would argue, it is articulated (i.e., connected) with multiple images, concepts, and ideas that give it meaning. Even applications of technologies

that appear to be obviously positive, such as easing the work of teachers or creating a student-centered learning environment, are intricately tied to discourses that challenge or reproduce power. For example, devices that are meant to relieve the mundane aspects of teaching often reinscribe, perhaps inadvertently, discourses that equate the difficulties of teachers' work to the performance of particular tasks. In marketing such devices, educational entrepreneurs promote the belief that these time-saving tricks can transform the lives of teachers. In doing so, they shift the problems and solutions from such weighty factors as the decades-long disinvestment from public education that has severely affected the work of teachers.

The use of technology in classrooms can also be a tool in promoting specific educational policies. Instruments initially intended for convenience can easily shift in usage to become data-gathering tools that facilitate the hyperscrutiny of educators within contemporary discourses that excessively constrict teacher accountability to student performance on high-stakes examinations. The evolution of standardized testing from a tool that was meant to assess students and inform instruction to a score that evaluated teachers (Nichols & Berliner, 2007) is a compelling example of the ways in which educational technologies morph within changing political contexts. The move from paper and pencil technologies to new digital technologies allows for the collection and analysis of massive amounts of data on a continuous basis. If educational reform continues on its current trajectory, it is not hard to imagine that programs like Accelerated Reader today, which are ostensibly meant to support teachers, will factor into a formula to measure the effectiveness of teachers tomorrow. The meanings of technological tools are by no means limited to these possibilities, but their uses in ways that restrict the work of teachers are increasingly likely within the current political and economic context that has become unabashedly disparaging of teachers.

Some of the arguments for new mobile learning technologies are coupled closely with claims that squarely place the blame for educational failure on outdated teachers who are unable to motivate technologically savvy youth. Rosen and colleagues (2010) describe the iGeneration as youth born in the 1990s and 2000s who "spend their days immersed in a media diet, devouring entertainment, communication, and . . . any form of electronic media" (p. 2). They are "master multitaskers, social networkers, [and] electronic communicators" who live in "social networks such as Facebook" (p. 2). In their assessment, these youth "absolutely hate" school because "education has not caught up with this new generation of tech-savvy children and teens" (p. 3), particularly in terms of delivery and setting. In contrast to being forced to "sit and listen as some old, stuffy teacher drones on and on about stuff from a book written like in the dark ages" (p. 1), they envision students wholeheartedly engaged in a simulated virtual learning environment that resembles a video game. In addition to the extremely naive assumption that *all* students would continue to be entirely engaged in such activity if it became a mandatory part

of their learning (diSessa, 2000), these advocates of mobile learning technologies articulate their position by drawing on hackneyed caricatures of teachers that do not acknowledge the complexities, difficulties, and, most importantly, successes of real educators. These distorted representations are tied to discourses that simplistically reprimand teachers and ignore the history, politics, and economics of educational inequality in the United States.

The vision of schooling promoted by Rosen and colleagues (2010) is also articulated with ideological meanings that are highly individualistic, promote business solutions to solve problems in education, and undermine the democratic purpose of schooling. They consistently rebuke teachers and schools for not adequately responding to the iGeneration's desire to "want it all and want it now." In doing so, these authors appeal to the value of student-centered learning without examining how their usage of the term complements ultra-consumerist discourses and obscures essential questions about the social and communal purpose of education within a democratic society.

No single solution or perspective is sufficient to address the multiple dimensions of education and learning within its larger societal context. Work toward equity and justice must constantly contend with the tensions and contradictions of multiple positions. Questions about mobile learning technologies from a perspective that focuses on teachers and pedagogy, which we highlight here, are by no means the only ones that need to be asked. But we find them sorely missing in contemporary dialogues.

Drawing on Giroux (2011), we distinguish pedagogy from simple skills, techniques, or disinterested methods for teaching specific content. Pedagogy is related to "the specificity of particular contexts, students, communities, and available resources" (p. 4). Pedagogy is not only important for students' future gainful employment, but it is essential for the "the construction of critical agents and . . . the formative culture that is indispensable to a democratic society" (Giroux, 2011, p. 4). Unlike the supposedly utopian learning environment envisioned by Rosen and colleagues (2010), where students are engaged in self-centered pursuits, we see pedagogy as central to sustaining the "modes of critical agency, dialogue, and social responsibility [that are] critical to keeping democracies alive" (Giroux, 2011, p. 13). It is essential to "creating those democratic public spheres where individuals can think critically, relate sympathetically to the problems of others, and intervene in the world in order to address major social problems" (p. 13). Pedagogy also entails acknowledging, contending with, and consistently attempting to address the impossibility of truly democratic dialogue within our current social, political, and economic structure (Ellsworth, 1989). With this vision of pedagogy, we attempt to:

1. Dispute what we see as two faulty assumptions about equity and interest that drive simplistic incorporations of mobile technologies in urban schools.
2. Discuss the three lenses of text, tools, and talk to understand, from a teacher perspective, the affordances of mobile technologies in learning.

Technology and Pedagogy in Urban Schools

Appeals to the transformative possibilities of new technologies take on distinct meanings and consequences within urban schools. Although the modifier *urban* defies clear definition and groups together schools with a widely varying set of characteristics (Watson, 2011), there is nevertheless a popular and pervasive association between failure and urban schools (Lippman, Burns, & McArthur, 1996). While unique challenges emerge in urban schools because of the intersection of location and poverty (Lippman et al., 1996), popular “articulations” (Hall, 1996) of *urban* most often connote an amalgamation of race, class, unskilled and undocumented immigrants, crime, violence, substance abuse, incarceration, single teen-mothers, and absent parents. Such representations emerge from both the real conditions of urban spaces (Gregory, Skiba, & Noguera, 2010) and the ideological construction of their residents as deficient (Valencia & Solórzano, 1997). By romanticizing the possibilities of digital gadgetry for leveling educational opportunity in urban schools, research, policy, and social discourse about education are able to skate past the demanding areas of inquiry tied to understanding effective pedagogy within the specificities of urban schools.

A sizable body of scholarship documents the pedagogical strengths a teacher must have in order to address the unique needs and to build on the distinct strengths of urban school students (Duncan-Andrade & Morrell, 2008; Gay, 2000; Ladson-Billings, 1995; Nieto & Bode, 2008; Valenzuela, 1999; Yosso, 2005). Within the dominant ideological context where technology is equated with advancement, however, educators convince themselves that they are addressing the historical and contemporary chasm of opportunity for urban school students by providing them with the latest gadgetry and the supposed high-status knowledge and skills that come with the devices. Reflecting these assumptions, they look to devices like iPads as “equalizers” that erase the “learning advantage” between “the poorest and most affluent” schools (Cuban, 2012). The adoption of technology thus buoyantly shifts the focus of educational policy and scrutiny from issues of historical inequity and effective pedagogy in urban schools to the false promise of a digital panacea.

Rather than narrowing the gap in educational opportunity and reducing the need for effective pedagogy, the rapid introduction of new technologies into schools often has the opposite effect. Recent reports about the use of mobile devices and digital technologies from the Pew Internet and American Life Project (Lenhart, 2009; 2012; Lenhart, Purcell, Smith, & Zickuhr, 2010) indicate that urban youth are accessing the Internet and wielding mobile devices just as prevalently as other groups. The digital divide so strongly warned about in government-issued reports like *Falling Through the Net* (National Telecommunications and Information Administration, 1995, 1998, 2000) has largely closed. As Jenkins (2008) notes, however, a “participation gap” has emerged that highlights stark disparities in how youth interact and access media through digital tools. This gap parallels inequities in the distribution of skills and lit-

eracies that youth will require in future jobs or, in the words of Gee (2004), as “shapeshifting portfolio people.” With the increasing presence of technology in the classroom, the role of an effective teacher is not diminished; instead, it becomes even more indispensable. The introduction of cutting-edge technology by itself does little to address issues of educational equity. Pedagogy that effectively leverages technology is fundamental and is characterized by employing these seemingly neutral devices to teach in ways that are culturally relevant (Ladson-Billings, 1995; Gay, 2000), build on students’ strengths (Yosso, 2005), enable students to understand relationships of power (Freire, 2001), and contend with the political nature of the gadgets themselves (Feenberg, 1991).

Moving Beyond Superficial Conceptualizations of Student Interest

Much of the dominant discourse suggests that mobile tools in learning market customization and adaptability as their greatest strengths. Ironically, this discourse also assumes a youth culture uniformly smitten and nimble with technology. A growing body of scholarship has problematized some key assumptions of these exceedingly optimistic visions. Eynon and Malmberg (2011), Facer and Furlong (2001), and Hargittai and Hinnant (2008) highlight the heterogeneity and inequalities in access to and use of digital information. Additionally, van den Beemt, Akkerman, and Simons (2011), building on Bennett, Maton, and Kervin (2008), argue that terms such as the “Net generation” (Tapscott, 1998), “Millennials” (Howe & Strauss, 2000), “digital natives” (Prensky, 2006), “Web generation” (Hartmann, 2003), or iGeneration (Rosen et al., 2010) homogenize the skills and intensity of youth engagement with technology. The persistent claim that students are adept with and interested in new technologies erases variation among students and the context specificity of interest and competency within each student. While dominant discourses on mobile technology claim that the devices make available multiple digital pathways for learning, such homogenization forces students to “adapt to the demands of cutting-edge technologies” (Mayer, 2005, p. 10) and restricts the very forms of human communication to particular digitally mediated avenues. Effective teachers are essential in differentiating, orchestrating, and negotiating students’ individual and collective interests and capacities, whether technological or not, to support their academic and holistic growth over time.

Despite the push to recognize the heterogeneity of student engagement with technology, a repeated and naive assumption exists among educators and researchers that technological devices will evoke interest, relevance, and engagement in student learning because of their popularity among youth. Selwyn (2006), drawing on the work of Lankshear and Knoebel (2004), cautions against such presumptions. He argues that beliefs about the homogeneity of youth interest in technology and attempts to “transport or co-opt” it into formal learning environments are often ultimately counterproductive

because “young people resent having their cultural forms (mis)appropriated into schools” (p. 16). Yet, zealous advocates of technology continue to overestimate the relationship between technology and youth interest and disregard a large body of scholarship concerning interest, relevance, and engagement. Hidi and Renninger (2006) problematize such simplistic notions of interest, distinguishing between situational interest and its more developed phases, which are often conflated in discussions of youth and technology. In most cases, they maintain, a smartphone in a classroom evokes situational interest at best. It must be held and sustained through meaningful and personally involving tasks but is not necessarily a precursor to more mature forms of interest.

Developing deeper forms of interest, engagement, and relevance takes time and is far from certain or predictable. Scholarship also demonstrates how difficult it is to facilitate learning contexts in which students can profoundly see the value of school content in their everyday lives or the other way around (e.g., Pugh, 2011). The context, *not the tool*, is what is important when making decisions about utilizing new technology within learning environments. Simply making a mobile device available to students or using these devices to study issues important to them does not bridge relevancy between the students’ multiple worlds. Here again the role of pedagogy is fundamental. As Wade (2001) points out, an effective teacher consistently invokes situational interest, with or without technology, through strategies such as brainstorming, observing, and introducing intriguing questions. Borrowing from Dewey (1913), while a technological device might help in “catching” an interest, pedagogy, the learning environment, and the specific contextual affordances of the device are indispensable in “holding” it. Rather than appreciating the possibilities and limitations of the situational interest afforded by new technologies and recognizing the opportunities for deeper engagement they provide for *some* students, wholesale advocates of technology in schools tend to go against Selwyn’s (2006) caution about homogenizing youth interest. As a result, they misappropriate youth cultural forms into schools, and their fantastical visions of learning fall flat within the realities of classrooms.

Assumptions about student interest in technology also gloss over the contextual nature of interest and the reality that devices such as smartphones serve purposes in out-of-school situations that are lost when they are placed within the currently inevitable constraints and regulations of schools. Azevedo’s (2011) study on hobbyists is particularly insightful here. He contests notions that interest is tied to objects. In his exploration of participants’ engagement with model rockets, Azevedo found that objects mediate several aspects of a person’s participation in a practice and serve multiple goals that might not be immediately apparent to an observer. For instance, with one of the study participants, persistent engagement with rockets advanced the participant’s social goals, such as maintaining friendships and strengthening relationships with family. As Azevedo (2011) puts it, “Context is key here: Across situations and time, interest objects may serve different purposes and function to sus-

tain engagement in more complex ways than frequently assumed” (p. 153). Barron’s (2006) work also reinforces the argument that interest is distributed across multiple settings, activity contexts, experiences, social networks, and resources. She demonstrates that interest is not a static quality but should be conceptualized in relation to learning ecologies that are “dynamic entit[ies] that can be characterized by the diversity and depth of learning resources and activities” (p. 214). Building on these perspectives, youth interest that involves smartphones is not tied to the device but exists in the relationships or activities that the device facilitates—dimensions of their lives that often do not have a place within the formal curriculum of the school.

Cuban’s (2003) work is a reminder that every decade over at least the last century touted a technological invention that purported to revolutionize learning. Whether the smartphones of today or the televisions of yesteryear, the push to adopt technologies in learning spaces fails when relevance and engagement are attributed to the tool rather than the context. Smartphones are interesting to youth because they allow them to communicate, congregate, find entertainment, take pictures, play games, etc. As we are finding in our current study, when students are provided with “school phones” that are stripped of these possibilities, much of the appeal is lost. Just as it is outlandish now (although it wasn’t a few decades ago) to assume that televisions could replace teachers, since youth are so inclined to spend their out-of-school hours in front of the screen, it would be naive to imagine that students’ social and out-of-school investment in technologies would fluidly transfer and sustain itself in formal learning environments.

The literature we surveyed in this section highlights the severe limitations of arguments for the incorporation of new learning technologies that rely on superficial assumptions about student interest. What we find missing in discussions about technology in the classroom is the centrality of pedagogy. Effective teachers can create classrooms that look similar to Collins and Halverson’s (2009) vision of learning “after the second revolution” even without new digital technologies. Additionally, even the best technologies fail when educators cannot leverage situational interests afforded by technology through classroom norms, practices, and structures, as suggested by Wade (2001) and Hidi and Renninger (2006).

Centering Pedagogy by Explicating Text, Tools, and Talk

We have argued that the impetus for the wholesale incorporation of new technologies into classrooms exists at the intersection of an undertheorization of student interest and a concomitant underestimation of the importance of pedagogy. To move beyond these ideological trappings of technology, it is critical to shift from a perception of a technological tool as an inherent object of youth interest or as a surrogate for effective teaching to an explication of its particular affordances within a classroom context. In our own attempts to

highlight how effective teachers leverage technology, we have found it helpful to articulate the text, tools, and talk (3Ts) that technology makes possible in a classroom. Distinctly naming the 3Ts facilitated by new technologies moves beyond cheery notions of interest and forces a clearer exploration of how student engagement is seeded and sustained through these contextual affordances of technology. By highlighting the texts, tools, and talk that teachers must expertly employ in a classroom, we discourage the technological discourse that deprofessionalizes teachers.

We name the 3Ts in an attempt to also rearticulate (Hall, 1996) the meaning of pedagogy in relation to youth interest and technology. Even ardent advocates of technology agree that teachers are important for the successful incorporation of new technologies into the classroom. Their ensuing remarks, however, highlight the underlying assumptions that the lackluster implementations of technology are due to the deficits of teachers. These technology advocates engage teaching only because they believe that “bad” teachers ultimately stand in the way of powerful instructional technologies. The solutions they propose are to “fix” the teacher by providing additional content knowledge, increasing familiarity with the technology, or instilling skills to manage and motivate the class. The technology itself goes unquestioned, creating the conditions whereby teachers and learners are forced to adapt to it (Mayer, 2005). Within a contested ideological terrain, the 3Ts work to unseat technology from its unassailable position by drawing attention to its contextual affordances, and also its drawbacks, from a pedagogical perspective.

The 3Ts give rise to surprisingly simple questions that often have exceedingly difficult answers. We engage in an exercise of identifying some of these questions that can surface the contextual capabilities and drawbacks of new technologies in classroom learning environments. We also note associated cautions that elaborate on aspects of these questions. These illustrative questions reflect our goal of advocating for educators to make purposeful choices about using technology in ways that enrich learning and address concerns of equity. We offer these not merely as rhetorical questions but in the hopes of sparking literal dialogue and deliberateness about learning and technology.

Texts

New technologies offer incredible opportunities to introduce new texts into the classroom, transcending many of the limitations of time and space that are characteristic of traditional textbooks. A previously unimaginable amount of up-to-the-second information from around the globe is accessible with the touch of a fingertip. Traditional texts can be transformed by ease of access as well as by their availability through new modalities. Students’ experiences outside of the classroom, encapsulated by images, video, sound, notes, and GPS tags, can ever more easily become texts for study. New technologies have also multiplied the prospects for students to create and exchange multimodal texts. The possibilities of activities that might contribute to culturally rele-

vant pedagogy (Ladson-Billings, 1995) or community cultural wealth models (Yosso, 2005) of learning—such as documenting the histories and lives of families, engaging in multisensory journaling, conducting layered mappings of neighborhoods, and then making them an integral part of classroom learning—become far richer with smartphones. But more is not necessarily better. Additional texts can be cumbersome and distracting. Introducing new forms of text without closely attending to the particular literacies that are required for each creates a classroom microcosm of Postman's (1990) dystopian society where "we are glutted with information, drowning in information, [but] have no control over it, [and] don't know what to do with it" (para 26).

Questions. What new texts will be introduced by the technology? How are traditional texts altered or remediated through new technologies? Why are these texts important for what students will learn?

Cautions. Beyond the initial allure, simply re-presenting traditional texts as pixelated displays does little to improve a learning experience. The graphic interface on a fancy smartphone does not help develop the academic literacies necessary for urban school students to advance beyond the stalled rates of college completion. Opportunities for learning the culture of power (Delpit, 1995) may be lost when simply replacing older texts with new ones. For instance, digitized texts on smartphones might increase accessibility, but, lacking larger displays and powerful markup software, they minimize the opportunities for students to closely analyze these texts. In our current study, we have experienced a related but distinct issue. There is a tendency for powerful texts about students' own lives, collected through smartphones, to be brought into the classroom without a clear rationale for how these texts support urban school students in becoming fluent in, or problematizing, the culture of power. If compelling learning affordances for new texts cannot be articulated, educators may need to step back and reevaluate the assumptions they are making about the textual opportunities that are gained through the use of digital tools.

Tools

The dynamic ability to collect, represent, visualize, analyze, interpret, and communicate texts increases tremendously with new technologies. Technologies can significantly transform how traditional curricula have been taught. For example, learning the laws of kinematics through an inquiry-based approach would have taken tedious setup with strobe lights a few decades ago or specialized computer probes a few years ago. Today, with the ease of a smartphone, the tedium of following procedures can give way to deeper conceptual understanding. New technologies as tools can also open avenues that simply did not exist before. These technologies can facilitate creative curricula about topics such as digital freedom and data privacy that will be increasingly vital in exercising democratic rights.

In an increasingly complex and interconnected world, new technologies allow people to see and interpret different aspects of their lives in powerful ways. For instance, in a classroom observation from our current study, when students plotted data that they had collected with their mobile phones using Google Maps, one student remarked, "This is creepy that they know where we were and when we were there!" The tool provided a visualization that could have seeded an important grounded exploration of freedom, surveillance, consumer expediency, and citizenship—conversations that might otherwise seem distant and impersonal. Similarly, easy access to Web-based census data coupled with powerful mapping software could enable urban school students to make their own material conditions a topic of empirical analysis and learning.

Whether it is a car that can go zero to sixty in three seconds or the latest iProduct, technological tools tend to be evaluated on an abstract measure of power rather than on their ability to fulfill particular contextual needs. It is easy to forget that in a tight parking spot, a subcompact is far more powerful than the exotic luxury sedan. When incorporating new technologies, educators must move beyond abstract measures of power and possibility and clearly articulate the rationale for how a tool will allow students to meaningfully collect, represent, visualize, analyze, or communicate texts for a particular set of learning goals.

Questions. How does the tool offer ways of collecting, representing, visualizing, analyzing, and communicating information that contributes to improved learning? What is the context of learning that makes this tool imperative to students' lives?

Cautions. Powerful technological tools, in the absence of powerful pedagogy, detract from rather than contribute to learning. We observed in our current study, for instance, how a number of students were drawn to using software to visually represent their data as word clouds. The technology that was available to them allowed them to engage with their data in potentially new and meaningful ways. However, without strong pedagogy to further guide students' inquiry, students used the bulk of their time to simply alter background colors, fonts, and formats. From an instructional perspective, the very power of technology as a tool to manipulate texts became its greatest pitfall absent effective pedagogy.

Talk

New technologies can redefine communication within a classroom. Students can continue to participate in classroom conversations outside of the confines of a building space through social media. Real dialogue occurs in virtual spaces. Asynchronous talk is possible as texts can move with students across physical and social spaces. But classroom discourse and interaction—what we refer to as *talk*—remains one of the most overlooked dimensions of incorpo-

rating technology in learning. Text and tools only gain meaning and relevance in talk. New technologies, for instance, might introduce rich texts that demonstrate the complexity and messiness of data, but as long as classroom talk centers on the teacher as the arbiter of knowledge, the power of those texts is not realized. Images and captions that reflect the world of students can be fluidly introduced, but without classroom discourse and interactions that support and build on the experiences of students, these possibilities fall flat. Without norms and practices that are valued in particular disciplines, such as physics or literature, even rich personal experiences or fancy tools will remain just that; they will be unsuccessful in meeting learning objectives. Even staunch advocates of technology, when they look beyond the gadgets and critically explore the qualities that make learning environments rich, begin to appreciate how “connection” and “community” among teachers and students seed the essential attributes of “curiosity” and a “sense of amazing possibilities” in learners (Young, 2012). In the words of Wesch, a tech-savvy professor who came to such a realization, “It doesn’t matter what method you use if you do not first focus on one intangible factor: the bond between [teacher] and student” (Young, 2012, para. 6). From our perspective, however, this bond is not so intangible. It encapsulates the culture of a classroom, forged through talk, as the teacher and students position themselves, their relationship to the discipline, and their connection to the world outside of the classroom.

Questions. How do we support classroom talk that leverages the texts, tools, and new forms of communication introduced through the technology to support student learning? Are the ways discourse transpires within classrooms made more robust as a result of this tool? How are forms of communication limited?

Cautions. Language practices and what is considered appropriate forms of talk often change with different tools. Educators routinely and appropriately attempt to build on students’ ever-increasing amount and varying modes of informal digital communication, such as texting. But attempts to presumably win youth over with textspeak can also sacrifice the limited opportunities that students have to grow as participants in academic discourse. Returning to Delpit’s (1995) notion of the culture of power, the inadvertent ramifications of imprudent innovations often disproportionately hurt urban youth, who have fewer opportunities to practice privileged codes of communication outside of school. For instance, asking students to use cell phones to text messages limited to one hundred sixty characters to summarize passages from Shakespeare’s *Richard III* (Bernard, 2008) might create situational interest. These practices might even provide important bridges between students’ varied repertoires of practice and teach valuable summarizing skills. But encouraging talk to occur only in byte-size fragments may also yield diminishing returns. As Garcia (2012) experienced in the high school English class he taught and

studied, asking students to text or type may take longer and inadvertently result in less rich conversation.

Within our contemporary ideological context, where technological tools are objects of desire and status and are equated to advancement and improvement, we do not find it surprising that surface-level conversations about student interest and equity are prevalent in discussions about technology in the classroom. We offer the 3Ts as generative lenses through which researchers, policy makers, and funders might come to appreciate the appropriate role of technology in the complex art and science of teaching. We recognize that teachers are not immune to these ideological associations of technology that ultimately work to undermine their own professional practice. We therefore also envision the 3Ts as a set of discursive and analytical tools through which teachers, and urban school teachers in particular, might critically examine and then rearticulate the purpose and nature of their work in light of technophilic ideologies.

Conclusions

In 1961 the *Harvard Educational Review* published B. F. Skinner's treatise "Why We Need Teaching Machines," in which the father of behaviorism described a mechanical device that taught and reinforced specific learning practices ranging from rhythm to "verbal knowledge." Skinner claimed that the machine could maintain students' interest because it provided regular reinforcement and always presented novel material. It could, he claimed, teach what teachers teach in half the time and with half the effort. Skinner's words are disconcertingly comparable to contemporary discourses concerning smartphones and other digital technologies in the classroom. The overreliance on android-based solutions to education (pun intended) often matches Skinner's faith in machines and his underappreciation of the work of teachers and the complexity of interest and learning.

Smartphones and teaching machines exist in a long line of attempts to replace the teacher. As Cuban (2003) describes, phonographs, radios, film projectors, televisions, computers, and more have come and gone with promises of revolutionizing learning. In each case, their thoughtful and careful incorporation has enhanced instances of learning by prompting valuable texts, tools, and talk. More often, shortsighted appeals to relevance and engagement have disappointed, but only until the next gadget hits the market. We firmly believe in the importance of incorporating new technologies into the classroom and continually bridging classroom and social uses of technologies, but we also push for critically examining the affordances and constraints of technology in classrooms in ways that look past its immediate allure.

Inherent within technophilic ideologies are assumptions about teaching and the work of teachers. There is a naive belief that technology is capable

of compensating for poor teaching by making classrooms “teacher-proof.” Another frequent trope that emerges is that inserting technology into classrooms will facilitate good teaching practices. That is, through osmosis-like processes, teachers will suddenly and across the board become great teachers by relying on digital tools. Sidestepping what many might see as the pesky time spent building relationships with students or as the pointless efforts to support teachers in developing their craft, technology is seen as something that can be simply added into classrooms. The just-add-technology-and-stir fallacy is especially problematic in how it frames educational issues as needing a short-term investment in devices or curricula rather than a longer-term investment in teachers and teaching.

When teachers and administrators explore the use of technologies in the classroom, they must be doubly cautious that they are not assuming that student interest is inherent to a gadget like a smartphone or that the instrument will transform learning and schooling to more equitable ends, particularly for students in urban schools. Relevance and transformation emerge through the interaction of texts, tools, and talk. Supporting teachers in these interactions to enable rich learning is a difficult task, layered at the classroom, institutional, and societal levels. Perhaps it is the daunting nature of this undertaking that prompts an unrealistic faith and hope that technology will solve the problem. To surface the centrality of pedagogy in learning, we argue that technology should be considered within an array of educational tools and strategies and judged in light of its potential to introduce or reshape texts, tools, and talk.

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Notes on Contributors

SHERRY L. DECKMAN is an assistant professor of social and cultural foundations of education at Ithaca College. Her research focuses on diversity in higher education and teacher education. She is coauthor, with M. Pollock, M. Mira, and C. Shalaby, of "But What Can I Do? Three Necessary Tensions in Teaching Teachers about Race," in the *Journal of Teacher Education*, and has written on engaging critical diversity in education reform in the forthcoming volume *Leading Educational Change* (Teachers College Press). Deckman began her work in education as a high school teacher in Washington, DC.

KIMBERLEE CALLISTER EVERSON is a recent graduate of Brigham Young University's educational inquiry, measurement, and evaluation doctoral program. Her research focuses on statistical and psychometric issues related to student growth and teacher evaluation. In particular, she studies quasi-experimental methods, value-added modeling, and teacher beliefs related to student outcomes-based accountability. Everson also has experience as a mathematics educator, focusing on statistics education and adult developmental mathematics.

ERIKA FEINAUER is an assistant professor in the department of teacher education at Brigham Young University's David O. McKay School of Education. She researches the language and literacy development of young bilingual students as well as the role of ethnic identity formation for Latino youth. Her recent publications include "Cross-Language Transfer of Early Literacy Skills: An Examination of Young Learners in a Two-Way Bilingual Immersion Elementary School," in *Reading Psychology*, and "Examining the Socio-Linguistic Context of Schools and Neighborhoods of Pre-Adolescent Latino Students: Implications for Ethnic Identity," in the *Journal of Language, Identity and Education*. Feinauer's research interests also include the identity development of in-service teachers as they relate to their work with language-minority students in their classrooms.

ANTERO D. GARCIA is an assistant professor in the English department at Colorado State University in Fort Collins. His recent research focuses on critical literacies, technology, and youth civic engagement. For eight years he was a teacher at a public high school in South Central Los Angeles. In 2008 Antero codeveloped the Black Cloud Game. A Digital Media and Learning Competition award recipient, the Black Cloud provoked students to take real-time assessment of air quality in their community. Using custom-developed sensors that measure and send data about air quality, students critically analyzed the role pollution played in their daily lives and presented recommendations to their community. Garcia is a 2012–2014 Cultivating New

Voices Among Scholars of Color Fellow with the National Council of Teachers of English and a 2010–2011 U.S. Department of Education Teaching Ambassador Fellow. His numerous publications and conference presentations address technology, educational equity, youth participatory action research, and critical media literacy.

PAM GROSSMAN is the Nomellini-Olivier Professor of Education at the Stanford University School of Education. She has published broadly in the areas of teacher education, teacher knowledge, and the teaching of English in secondary schools. Her current work focuses on organizing teacher education around core practices of teaching and leveraging observation protocols for professional development. Grossman is a member of the National Academy of Education and currently serves as the faculty director of the Center to Support Excellence in Teaching.

HEATHER C. HILL is a professor at the Harvard Graduate School of Education. Her primary work focuses on developing new measures of mathematics teacher and teaching quality and using these measures to inform current policies and instructional improvement efforts. She is codirector of the National Center for Teacher Effectiveness and also principal investigator of a five-year study examining the effects of Marilyn Burns Math Solutions professional development on teaching and learning. Her other interests include instructional improvement efforts in mathematics and the role that language plays in the implementation of public policy. Hill has served as section chairs for the American Educational Research Association and Society for Research on Educational Effectiveness conferences and on the editorial boards of the *Journal of Research in Mathematics Education*, *Elementary School Journal*, and *American Educational Research Journal*. She is the coauthor, with David K. Cohen, of *Learning Policy: When State Education Reform Works* (Yale University Press, 2001).

GRAHAM OLIVER is a freelance writer and a student in the master of arts in rhetoric and composition program at Texas State University. He received his BA from Southwestern University. His prose and poems have appeared in *Punchnet's*, *Front Porch Journal*, *Cenizo*, and the 2013 *Texas Poetry Calendar*. Oliver's work continues to focus on using personal narrative to explore wider social questions.

THOMAS M. PHILIP is an assistant professor in the urban schooling division of the Graduate School of Education and Information Studies at the University of California Los Angeles. His research focuses on the ideological contexts that shape teachers' work and on the processes of ideological change in teachers as they make sense of the purpose and nature of their work within a stratified society. His scholarship, which leverages theoretical and methodological approaches from the learning sciences to explore issues in ideology, particularly racial ideology, has appeared in journals such as *Cognition and Instruction*, *Journal of Teacher Education*, *Urban Education*, and *Race, Ethnicity and Education*. Thomas received the National Academy of Education/Spencer Postdoctoral Fellowship in 2010.

ERIC DARNELL PRITCHARD is an assistant professor of African and African diaspora studies at the University of Texas at Austin. His writings have appeared in *Palimpsest*, *Southern Communication Journal*, *Home Girls Makes Some Noise: Hip Hop Feminism Anthol-*