

The Challenge of Digital Technologies to Educational Reform

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Abstract: Although educational reform efforts have failed repeatedly over the last 40 years, this paper posits that the cultural revolution currently underway as a result of the widespread use of digital technologies will put additional pressure on the traditional culture of the school. This paper queries how teacher educators might react to these challenges given that the first wave of people that has grown up with Web 2.0 technologies is entering teacher education programs. The social interactions associated with the ideas of “digital publics” and “collective intelligence” are conceptualized as opportunities to create radically restructured learning experiences within a teacher education program. Teacher educators would do well to find ways to leverage the potential of digital publics and collective intelligence to create productive learning experiences in their classrooms.

The Culture of School and the Problem of Educational Reform

Calls for educational reform are not new, nor are commentaries on the failure of educational reform efforts. Teachers, by and large, still rely heavily on their ability to talk about curricular content. Students, by and large, still spend a great deal of time listening to what teachers have to say. Sarason (1996, p. 343) argues that educational reform will continue to fail until teachers experience what he calls a “context of productive learning.” Such a context is predicated on the notion that both teachers and students should share intellectual control over what happens in the classroom and that a mutual understanding is a necessary part of the learning process: “Teacher and student have different frames of reference, which can vary from no overlap in mutual understanding to a productive mutual understanding” (Gwazek & Sarason, 2007, p. 12). Unfortunately, research on teacher education program indicates that the ways in which teacher candidates learn during their preservice preparation programs is anything but productive (Cochran-Smith & Zeichner, 2005). How can we expect teachers to create contexts of productive learning in their classrooms if they have not experienced such contexts in their teacher education programs? Have teacher candidates ever experienced a pedagogy grounded in productive mutual understanding?

While it is tempting to equate “mutual understanding” and empathy, the notion of mutual understanding is directly related to the explicitness of the pedagogy being used in teacher education classrooms. To what extent do teacher candidates have intellectual control over the process of learning to teach? Are teacher education programs the sites of radically different, non-traditional approaches to teaching and learning, or do they tend to feature the same cultural assumptions about what counts as teaching and learning as the rest of the school system? Cole (2003, p. 10) paints a bleak picture, arguing that “efforts to challenge the norms that continue to govern and define teacher education as a site of inauthentic practice are consistently overpowered by status quo structures and perspectives.”

The notion of “productive mutual understanding” in education may not seem novel until one considers the effects of what Lortie (1975, p. 62) called the “apprenticeship of observation.” The apprenticeship of observation refers to the acculturating effects of mass schooling. Students spend thousands of hours in schools, observing and internalizing teachers’ behaviours. Even from a young age, students are able to do a reasonable impression of how a teacher behaves. As a result, adults who have attended school have well-developed ideas about the characteristics of good teaching, most of which are tacit and unexamined. The problem with these ideas, as Lortie (1975, p. 62) noted, is that they are created from a “specific vantage point”: the vantage point of the student. Teachers tend to focus on teaching curricular content. Few, if any, teachers are explicitly trying to teach students how to be teachers. The result is that teacher candidates come to teacher education programs with strong default ideas about how to teach that are largely based on mimicking the behaviours of teachers they have had during their schooling. Thus the teaching and learning patterns traditionally associated with school are replicated with each generation of new teachers.

These patterns, which Tyack and Tobin (1994, p. 453) called the “grammar of schooling,” are deeply entrenched and highly resistant to change. There have been many attempts to reform the culture of the schools; none have resulted in fundamentally different ways of thinking about teaching and learning (Sarason, 2002). The challenges offered by emerging digital technologies, however, offer the potential to disrupt the culture of schools. This disruption will likely occur in response to the new expectations students and teacher candidates will bring to learning environments in schools and in teacher education. This paper names two key challenges to the traditional culture of schools and queries how teacher educators might react to these challenges.

The Challenge of Networked Publics

Social networking sites such as Facebook and MySpace are undoubtedly an important part of the culture of adolescence in North America. Given that these sites launched in 2004 and in 2003, respectively, sufficient time has passed for those who used these sites as adolescents to enter teacher education programs with the ambition of becoming teachers. Many teacher candidates carry with them habits of interacting online that affect their worldviews as a result of several years of participating in what boyd, who spells her name in lowercase letters, (2007, p. 8) has called “network publics.”

The concept of the networked publics, such as social-networking sites, is distinct from more traditional definitions of both unmediated and mediated publics. An unmediated public is a traditional public space, such as a park or a shopping mall, where the potential audience for any given event is limited to those present. A mediated public is a public that has recording media—traditionally limited to television, radio, and newspaper but increasingly including digital camera and the plethora of tools available on smartphones— that records events in public spaces. As boyd (2007, p. 126) notes “The potential audience is affected by the properties of the mediating technologies, namely *persistence, replicability, and invisible audiences.*” Essentially, a mediated public has a potential audience of *everyone*, at any time, because mediating technologies provide a permanent record (persistence) that is often posted online. This permanent record (or portions of it) can easily be copied to any other place (replicability). Finally, once the permanent record is in place, it becomes difficult to ascertain who the audience is at any given moment, and even more difficult to guess who future audiences might be (invisible audiences).

Network publics, defined as “the spaces and audiences bound together through technological networks” (boyd, 2007, p. 126), add a fourth dimension to mediated publics as a result of the “*searchability*” (boyd, p. 127) inherent in networked publics. Search functions, such as tagging, of network publics enable people to find one another quickly, to share and comment on content, and to create modified versions of existing content for their own purposes. As boyd (2007, p. 127) observes, “The bounding forces of networked publics are less constrained by geography and temporal collocation than unmediated publics.”

Although networked publics have not been in existence for very long, they have had a pervasive impact on both offline and online culture. The four characteristics of networked publics defined by boyd (2007) provide an interesting set of lenses with which to view the ways in which teacher candidates might approach the challenges of learning to teach. Do the search functions of networked publics enable teacher candidates to find one another more easily before their pre-service program begins, so that they might develop a sense of community before making their first tuition payment? Does the persistence of social networking sites affect how teacher candidates “write themselves into being” (boyd, 2007, p. 131), particularly as they navigate from an identity of a university student toward an identity of a professional teacher? Does the ease of copying and modifying online records from digital publics affect how teacher candidates create lesson plans and learning experiences for their future students? Finally, are those who are used to participating in networked publics more comfortable with the concept of an invisible audience, and what effects might this comfort have on the development of their identities as teachers?

The Challenge of Collective Intelligence

Shirky (2008) makes a strong case that we are in the midst of a period of major social innovations. The reason for these innovations is that the digital technologies often grouped together as Web 2.0, such as Wikipedia, Flickr, and social networking, have enabled people to produce, co-operate, and collaborate in ways that they never have before.

According to Shirky, people are willing to participate and interact because Web 2.0 technologies have lowered the “cost of experimentation” (Young, 2009). There are almost no consequences to trying Web 2.0 technologies, and in many cases users have used these technologies in ways that their creators had not originally intended.

One of the reasons that people engage with Web 2.0 technologies is that “the impulse to share is basic, but the means to do so are often clunky” (Shirky, 2008, p. 148). Compare, for example, the relative ease of sharing photos with relatives who live across the country today with doing so 20 years ago. Before the advent of photo-sharing services such as Flickr and Facebook, one would have to not only make physical copies of any photos one wished to share, but also send said photos through the mail to the person or group one wished to share with. It is difficult to overstate how much simpler this process is made by photo-sharing services. It costs nothing except time (albeit brief) to download pictures from a camera, upload them to a site (many of which do not have space limitations), and email a relevant link to friends and family. “Tagging” features, which allow one to name all of the people in a photo, can simplify this process even further by enhancing the searchability of digital publics.

Shirky (2008, pp. 47–54) develops the idea that sharing, co-operation, collective production, and collective action are the primary ways in which people use Web 2.0 technologies for social interactions. Taken together, these four types of interaction might be thought of as manifestations of collective intelligence, a field attributed to Engelbart although he tended toward the term “augmented intelligence” (Engelbart, 1962; Engelbart & English, 1968). Wikipedia, often held up as an example of collective intelligence, states “Collective intelligence is a shared or group intelligence that emerges from the collaboration and competition of many individuals” (Collective Intelligence, 2009). Similarly, the MIT Centre for Collective Intelligence (2009) asks: “How can people and computers be connected so that—collectively—they act more intelligently than any individuals, groups, or computers have ever done before?” The question is germane to educators today, particularly teacher educators concerned with preparing future teachers who are going to be interacting with a youth culture that is used to sharing, co-operating, and collaborating online.

Traditionally, the education system in North America has been geared toward individual achievement and the completion of individual tasks. Despite some interest in teaching strategies such as jigsaw-group work and co-operative learning, the overall focus of the education system on traditional, transmission-oriented approaches to teaching and learning remains strong (Hargreaves, 2003). The challenges to education associated with the “low-cost” of social interactions, particularly interactions that allow groups of individuals to do things that collectively seem intelligent, are of particular interest to teacher education. Are teacher candidates able to transfer the skills they have developed at sharing social information online to an academic environment? What opportunities can teacher educators provide that enable not only the sharing of information in the teacher education environment, but also co-operation and collaboration toward a co-construction of knowledge? Finally, is there a potential for small groups of teacher candidates in teacher education programs to connect with other groups of teacher candidates for the purpose of engaging in a collective action?

Future Directions for Research

Over 25 years ago, science fiction author William Gibson coined the term “cyberspace” as a “consensual hallucination experienced daily by billions of legitimate operators A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding” (Gibson, 1984, p. 51). In Gibson’s novel, cyberspace was very much a *separate* space from the everyday, physical *real* space. Although the same spirit may have infused the early days of the world wide web in the 1990s, the notion of online social spaces being distinct from reality has less relevance in a world where people have come to expect a low-cost to social interactions online.

Teacher educators need to attend to the challenges that both networked publics and collective intelligence offer to the culture of school. We are witness to the first wave of teacher candidates entering teacher education programs who are used to engaging in networked publics in their personal lives. With them come a host of expectations of the ways in which people can share, co-operate, and collaborate online. Although interacting with family and friends through digital technologies might be obvious to teacher candidates, the long apprenticeship of observation has not engaged teacher candidates in thinking about how these digital technologies might be leveraged to teaching and

learning environments. Their social interactions via Web 2.0 still represent a personal cyberspace, distinct from what teaching and learning *should* look like.

Teacher educators have a golden opportunity to disrupt the effects of mass acculturation by using technologies that are likely to contribute to collective intelligence. In my own responsibilities as a physics and mathematics methods professor, I am interested in the ways in which I can create a context of productive learning by using networked publics as an environment to encourage Gwazek and Sarason's (2007) notion of mutual understanding. Several questions emerge from this line of thinking. What sorts of digital technologies can best support an emergent, collective intelligence in a teacher education methods course? What is the role of the teacher educator in such a collective? Under what conditions might teacher candidates undertake a collective social action?

These questions demand rigorous investigation and thoughtful answers. Given my role teaching both a physics and a mathematics methods course next year, I am in a position to co-create and investigate online environments that augment our face-to-face meetings and that disrupt the effects of the apprenticeship of observation. "Social tools don't create new motivations as much as amplifying existing ones," writes Shirky (2008, p. 293), and the new digital technologies associated with Web 2.0 go a long way to enhance the natural desire of learners to work together on a common problem. In an essay lamenting the failure of educational reform in Canada over 35 years ago, Bremmer (1974) argued that educational reform had not really failed because it had not really occurred. He stated that "reform is the activity which links the past and the future Reform is intelligence, the human mediation between various elements in the social and physical environment, the process of interaction in an insistent present" (Bremmer, p. 8). The current proliferation of digital technologies has the urgency of an insistent present, replete with challenges to the traditional culture of teaching and learning in schools. To borrow another turn of phrase from Gibson (1984), perhaps it is the teacher educators who are most at risk of a "consensual hallucination" if we ignore the challenges.

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