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"Computer as Data Gatherer" for a New Generation: Martorella's Predictions, the Past, the Present, and the Future of Technology in Social Studies

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Abstract

In his 1997 article "Technology and the Social Studies - or: Which Way to the Sleeping Giant?" Peter Martorella made several predictions regarding technology resources in the social studies. Through a 2014 lens, Martorella's Internet seems archaic, yet two of his predictions were particularly poignant and have had a significant impact on social studies instruction: the phenomenon of "computer as data gatherer" (p. 513) and a "new generation" of the Internet that would become more interactive (p. 512). This paper highlights the literature in these two areas, beginning with a focus on the vantage point from which Martorella was writing. The paper also describes the learning potential inherent in more recent technological developments, particularly mobile technology devices, and the degree to which they are currently being used in K-12 social studies.

> Books will soon be obsolete in schools. Scholars will soon be instructed through the eye. It is possible to teach every branch of human knowledge with the motion picture. Our school system will be completely changed in ten years (Thomas Edison, 1913, as quoted in Saettler, 1990, p. 100).

Nearly a century has passed since Thomas Edison's prognostication of educational technology's potential to transform the nature of instruction and learning. While Edison's prediction did not come to fruition, similar forecasts have been made for over 30 years of computer hardware and software becoming tools that offer major improvements to the teaching and learning process.

An Apple advertisement from 1979 offered educators "computer-assisted instruction capabilities, including drill and practice, tutorial, problem solving, games, simulations, and more" (Maher, 2011). Academics of the 1980s also proclaimed affinity for computer use in social studies instruction. For example, Diem (1983) encouraged social studies teachers to begin using technology in their instruction, and White (1987) described using this technology to allow high school students to "reach out to peers around the world" (p. 44).

Among the more famous computer simulations of the 1980s-1990s was The Oregon Trail, which allowed students to simulate an experience travelling west across North America prior to the American Civil War. Although Bigelow (1997) revealed a number of shortcomings of The Oregon Trail, particularly in regard to a number of cultural biases inherent in the game, he acknowledged that it (then played from a CD-ROM) was "encyclopedic in the amount of information" (p. 84).

The 1990s saw the spread of the Internet in society and schools, which Friedman and VanFossen (2010) pointed out had enough impact to garner multiple proclamations that it could do nothing short of revolutionizing social studies education. Fast forward to the 2010s, and the Apple iPad (2012a) boldly claimed on its website, "The device that changed everything is now changing education." Apple noted that this particular device "inspires creativity and hands-on learning with features you won't find in any other educational tool." In terms of social studies content, the website contained a screenshot of an essay on Ancient Rome, presumably written for an Advanced Placement World History course.

Amidst the rhetoric of technology being a change agent within the social studies lies a relatively short piece written by the late Peter Martorella in 1997, about 2 years after the Internet had begun to make inroads in mainstream American society, followed soon thereafter by its inclusion in schools. The title of Martorella's article, "Technology and the Social Studies - or: Which Way to the Sleeping Giant?" invoked a powerful image of a social studies curriculum that would soon be taken over, or at least be strongly influenced, by technology resources.

Although the terms technology, computer, and the Internet are not entirely synonymous and cannot necessarily be interchanged for one another, they do have commonalities, particularly in terms of social studies education. The wealth of freely accessible social studies resources on the Internet has been well documented (Cohen & Rosenszweig, 2006; VanFossen & Shiveley, 2000).

Technology in the Mid-1990s

Martorella's article was published in September 1997. A presumption may be made, therefore, that the bulk of its writing was likely accomplished no later than during the 1996-1997 academic year. To understand fully Martorella's vantage point, it is critical to examine the state of technology available during this time, particularly as it related to social studies. To do so, as Martorella (1997) noted, it is instructive to examine the archives of *Social Education*, *Social Studies and the Young Learner*, and *Theory and Research in Social Education,* which are generally regarded as the flagship practitioner and research journals for the field.

When Martorella (1997) was writing, he found a dearth of technology-related articles. Six years later, VanFossen and Shiveley (2003) reported that the number and percentage of Internet-related presentations at the National Council for the Social Studies annual

conference had risen steadily from 1995-1999, but by the beginning of the 21st century these numbers had begun to reverse themselves.

In January 1994, *Social Education* contained an "instructional technology" section in which Pride described the use of videodiscs (which can be used on a computer but do not require an Internet connection). The November/December 1994 issue contained Szczerba's article, entitled "Databases, CD-Roms, and Cassettes," and mentioned the Internet as an information source.

Four issues later, (April/May 1995) Wilson and Marsh wrote the initial *Social Education* article that focused on the Internet's use in social studies education. They described it in epic terms, noting that it "may not only enhance but further revolutionize and even institutionalize…new approaches to teaching" (p. 198).

Nearly a year later (February 1996), Risinger began, in his words, "the first column of a new regular feature for *Social Education*," with a "goal…to help classroom teachers and other social studies educators tap into and utilize the tremendous resources of the Internet and the World Wide Web (WWW) in their curriculum planning and instruction" (p. 111). This column described the basics of the Internet and World Wide Web, as well as providing four websites to get the novice user started.

From this point forward, Risinger has regularly appeared in *Social Education,* providing social studies educators with Internet-based resources targeted at a specific domain within the social studies (e.g., Risinger, 2000, 2006, 2012). In a similar fashion, *Social Studies and the Young Learner* began a media corner section in the second half of the 1990s, in which specific Internet resources for teaching social studies were provided and described (e.g., Foster & Hoge, 1997; Helms & Finegan-Stoll, 1998).

A juxtaposition of screenshots from the National Council for the Social Studies' (NCSS) official website homepage in 1996 and in 2012 (Figure 1) illustrates the Internet about which Martorella was writing, as well as the Internet today. In addition to the far superior aesthetics, a quick glance shows that the current NCSS website (as is common) allows users to search the site using Google and links to the social networks Twitter and Facebook. These services were not in existence in 1996, and their presence on the present-day NCSS website does not begin to describe their ubiquity, the omnipresence of the Internet, and the interconnectedness of the world that did not previously exist.

It has been estimated that there are nearly 6 billion Google searches a day (Statistic Brain, 2014). *The New York Times* put the number of worldwide Facebook users at "901 million" (Sengupta, 2012), and the Pew Internet and American Life project estimated "some 15% of online adults use Twitter, and 8% do so on a typical day" (Smith & Brenner, 2012). These figures all give credence to the interconnected world in which we now live, as described by Thomas Friedman (2005) in *The World is Flat*. In 1996 this world did not exist.

For Martorella, not only did these companies (including the video sharing website YouTube) not exist, the Internet itself was dramatically different. At its most basic level, the Internet consisted, by and large, of a one-way path of information, from those who had access to Internet servers and knew hypertext markup language (HTML) to those who accessed these websites, often on Internet Explorer, Netscape Navigator, or for those in the United States, America Online. Through our current lenses, Martorella's Internet seems archaic, yet he asserted that "we have entered the information age where computers are ubiquitous and dominate our lives" (p. 513).

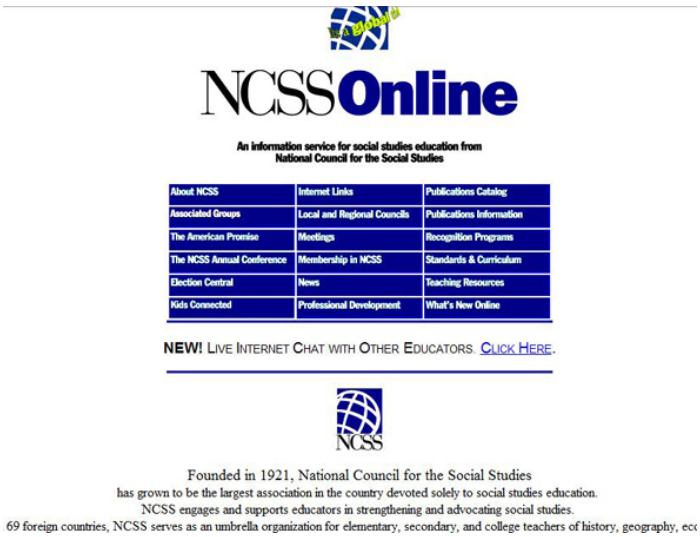

Figure 1a. Screenshot of National Council for the Social Studies' official website, October 17, 1996.

Figure 1b. Screenshot of National Council for the Social Studies' official website, January 8, 2014.

He made several predictions of and about computers, in general, and the Internet, in particular. Two of these predictions were particularly poignant and have had (and in all likelihood will continue to have) a large impact on social studies instruction. Martorella predicted the phenomenon of "computer as data gatherer" (p. 513). He also predicted a "new generation" of the Internet that would become more interactive (p. 512). This paper will focus on these two themes.

Computer as Data Gatherer

Undoubtedly, Martorella's (1997) notion of a computer as data gatherer has come to fruition. The Internet contains a vast array of information and is accessed around the world, having profound ramifications for the teaching and learning of social studies. The 1990s-2000s saw a burgeoning of historical collections on the Internet, which tended to

be static websites (in other words, there was little to no interactive capacity). These collections were oftentimes sponsored or financed by a university.

Examples included (but were certainly not limited to) the Valley of the Shadow project from the University of Virginia, DocSouth from the University of North Carolina at Chapel Hill, and The Avalon Project from Yale Law School. Information that was previously difficult or impossible to obtain became instantaneously (and freely) available for any teacher with an Internet connection.

This access was uncharted territory for social studies teachers and students alike, which did not go unnoticed. Cohen and Rosenzweig (2006) noted that this availability of historical materials had the potential to change social studies instruction, writing that literally anybody, from "high school student…to senior historian" has unprecedented access to social studies materials, not only from libraries around the world, but instantaneously (p. 4).

An example of this data gathering was the Virginia Center for Digital History. During the 1990s, as Martorella's proverbial sleeping giant was taking form, historian Ed Ayers, a visionary and cofounder of this center, along with other faculty from the University of Virginia, began collaborating with the Institute for Advanced Technology in the Humanities. They developed "a research library in a box, enabling students at places without a large archive to do the same kind of research as a professional historian" (Ayers, 2005, p. 73).

In 1999, 2 years after Martorella's prediction of computer as data gatherer, Ayers published "History in Hypertext," which described the potential for teaching and learning history through the use of a digital archive residing on the Internet. Ayers (1999) offered insight into the development of the Valley of the Shadow, which is "a large digital archive about two communities before, during, and after the American Civil War." It was "designed to explore some the fundamental tensions of history." To build this archive, the authors "combin[ed] dozens of databases," and within the archive there are "connections within each database and across many of them" (online). Clearly, Martorella's vision of "computer as data gatherer" was beginning to take shape.

Contemporaneously, the newfound provision of Internet-based resources helped to spawn the digital history genre. In 2008, the Organization of American Historians' *The Journal of American History* published a conversation among prominent digital historians about their work. In this article, historian William G. Thomas, III, a pioneer in digital history who in the late 1990s co-founded this term, noted that "digital history is an approach to examining and representing the past that works with the new communication technologies of the computer, the Internet network, and software systems" (p. 454).

In its simplest form, noted historian William J. Turkell in the same article, "digital history makes use of sources in digital form" (p. 454). Thomas added that "it is a methodological approach framed by the hypertextual power of these technologies [those noted above] to make, define, query, and annotate associations in the human record of the past" (p. 454).

Impact on Teaching

Clearly, the growth of the Internet spawned the plethora of digital history resources that are now available, which is a testament to the fortitude of Martorella's (1997)

prediction. During these beginning stages, this notion of availability of sources was well received in social studies literature, and accordingly, bold predictions were made. Braun and Risinger's 1999 edited book, *Surfing Social Studies: The Internet Book*, described the Internet as a "truly revolutionary development in the production and distribution of materials," and they lauded its potential "as [an] exhibition space for student multimedia projects" (p. 7).

During the 1999-2000 academic year, as the Internet had begun to make inroads in schools and received wide acclaim in the social studies literature, VanFossen (2000) published a study of secondary social studies teachers in Indiana and their instructional use of the Internet. This study substantiated the notion of Internet availability in schools, as "95.8 percent" of the study's respondents "reported having access to the Internet somewhere in their school building" (p. 93).

Despite this availability, "nearly half [of the teachers surveyed]…were low-frequency users of the Internet," and of those who did use it, many did so for lower order tasks, what VanFossen coined "glorified information gathering" (p. 104). Martorella's prediction held true.

During the first decade of the 21st century, several other studies of social studies teachers' Internet use were undertaken. Hicks, Doolittle, and Lee wrote a 2004 article entitled "Social Studies Teachers' Use of Classroom-Based and Web-Based Historical Primary Sources." Although the teachers in this study did not use primary sources of either type to a large degree, the title of the article acknowledges a tacit assumption that primary source documents were widely available on the Internet at this time.

Subsequently, Marri (2005) described how one teacher used technology to teach citizenship education, while Friedman (2006) portrayed teacher access to computer projectors as paramount in Internet-based primary source use. The results of this study showed that at the midpoint of the first decade of the 21st century, access to technology hardware was a major determinant of whether or not social studies teachers utilized Internet-based primary sources.

In the latter part of the decade, VanFossen and Waterson (2008), as well as Friedman (2008), once again assuming easy access to Internet-based primary sources, reexamined how social studies teachers used them in their instruction in Indiana and North Carolina, respectively. The results of these studies revealed little change since VanFossen's (1999-2000) study, particularly regarding a general lack of Internet use to support higher order thinking. This literature all gives credence to Martorella's vision of "computer as data gatherer."

Interactive Internet

Similar to his prediction of computer as data gatherer, Martorella foresaw the capacity for increasing interactivity on the Internet. Starting around 2004, the Internet began to evolve from what was essentially a one-way conduit of information to one in which anybody could easily and immediately post content online. Originally, publishing to the Internet was a somewhat cumbersome process. An individual needed to know HTML code and have access to a server in order to publish to the Internet (which was often the case at universities). Readers were consigned merely to consuming this information and were left to decide for themselves its trustworthiness.

The advent of Web 2.0 tools changed this circumstance. Maddux, Liu, and Johnson (2008) asserted that "Web 2.0 is made up of a set of Web participation tools, and they are, in large part, the next logical extension of the powerful and revolutionary idea that gave rise to the Web itself" (p. 160). In being the Internet's next step, Web 2.0 tools have "so simplified" the process of generating (as opposed to merely consuming) information on the Internet that "anyone with a computer and an Internet connection" can do so, thereby creating the interactive Internet that Martorella envisioned (p. 160).

Thousands of Web 2.0 sites exist; as a result, a phenomenon arose that paralleled the era when the Internet was initially developed. Although the Internet was originally praised for its provision of heretofore difficult-to-obtain materials, the major advantage of Web 2.0 was that it provided simple and instantaneous capability to contribute to the Internet. This new, facile process of contributing text, images, music, and video solidified Martorella's (1997) notion of computer as data gatherer.

In the early 1990s, well before the advent of Web 2.0, historians Ed Ayers and Will Thomas were conceiving the idea of the Valley of the Shadow project, which chronicles both a Northern and Southern community prior to, during, and subsequent to the American Civil War using the Internet as a medium. As they were deciding what to include and how it should be presented, Ayers (2005) recalled not desiring a static website in which readers were limited to reading information: "We knew that we did not want to use the computer merely as a distribution device" (p. 88).

Instead, he noted, "We wanted to rethink the ways that text could be presented on computer screens" (Ayers, 2005, p. 88). In so doing, Ayers (2005) argued, they were creating a digital article in which "people could start from many different places and follow many different paths" (p. 88-89).

This capability has had major ramifications in terms of teaching and learning history. Milman and Heinecke (2000) were among the first academics to study the impact of student-generated content through the use of technology and, perhaps fittingly, did so in an upper-level undergraduate history course cotaught by Ayers and Thomas at the University of Virginia in the late 1990s. They examined how student analysis of historical content and subsequent development of Web sites influenced constructivism and found that this medium served to develop a more student-centered class environment, in which students were actively engaged with the content and reported learning both historical research and technology skills.

Teaching and Learning History With Web 2.0 Tools

The advent of Web 2.0, or what Martorella termed "interactive Internet," came with a potential to augment the processes for teaching and learning history. In many ways it rivals (or perhaps exceeds) the hype and anticipation that the Internet originally generated in the mid-1990s. While the mid-1990s Internet was certainly revolutionary as a data gatherer, and it provided a seemingly infinite increase in information to teachers and students, the mere provision of information did little to modify teaching and learning practices (Friedman, 2008; VanFossen, 1999-2000, VanFossen & Waterson, 2008).

Via their interactivity, Web 2.0 sites have a greater potential to alter instructional practices of social studies teachers, which has been supported in the literature. Holcomb and Beal (2010) described Web 2.0 specifically in regard to social studies and described several Web 2.0 tools alongside examples of how they may be used in the social studies classroom. Friedman and Heafner (2010) noted that Web 2.0 resources can potentially

"shift the applications of technology in learning from student as consumer to student as contributor who is actively engaged with digitally-based content" (p. 318).

Several studies have examined Web 2.0 tools within the context of a secondary social studies classroom. For example, Friedman and Heafner (2007) investigated student use of wikis within 11th-grade United States history classrooms and their impact on engagement, enjoyment, and achievement. In these studies, students evaluated Internet-based primary source documents (which in itself is a testament to Martorella's notion of computer as data gatherer) as a basis for developing wikis to demonstrate their understanding World War I and World War II. The results showed that students, by and large, enjoyed these projects, but short-term achievement was similar to that of students who did not engage in this activity (Friedman & Heafner, 2007). When subsequently tested 8 months later, students who created wikis outperformed their peers who did not, however (Heafner & Friedman, 2008). In another study of a Web 2.0 tools (in this case the use of Voicethread as a debate tool), Lee and Friedman (2009) found that it was not particularly well suited to debate, but suggested that the tool has great potential, particularly in regard to incorporating "visual images, audio, and ultimately higher-order thinking" (pp. 24-25).

Mobile Technology

Web 2.0 technology can certainly foster an interactive and potentially beneficial experience for students. An implicit, underlying notion in social studies Web 2.0 research, however, is that these studies have taken place using desktop computers with a wired Internet connection, or perhaps with laptops and a school's wireless Internet connection, but using a personal computer operating system. A more recent iteration and evolution of the Internet is the development and increasing popularity of mobile technology devices, such as smartphones and tablets. These tools bring Martorella's themes of data gatherer and interactive Internet together, as they allow teachers and students all of the benefits of a wealth of information coupled with interactivity but untethered from a specific Internet access point. They, instead, allow users to access the Internet from virtually any location in the world.

For the purpose of this paper, mobile technology refers to any device that has the capability to use the Internet from any Wireless Fidelity (commonly referred to as Wi-Fi) network or through a connection of its own on a third or fourth generation (3G or 4G) network. Commercially available tablets include (but are not limited to) the Apple iPad, Google Nexus, and Amazon Kindle. Some examples of mobile (often referred as cellular) telephone brands that have these capabilities are the Apple iPhone, Samsung Galaxy, Research in Motion Blackberry, and the HTC Inspire.

In the past several years, these devices have become immensely popular worldwide, and trends point to their popularity and influence increasing. In their 2011 book *That Used to Be Us*, Thomas Friedman and Michael Mandelbaum noted that the number of cellular telephones in the world has more than quadrupled in the past decade, a statistic they described as "staggering" (p. 59).

Anderson and Rainie (2008) predicted that mobile devices "will be the primary connection tool to the Internet for most people in the world in 2020" (p. 2). Alongside the burgeoning popularity of these devices, another evolution of the Internet began to take place during the second half of the 21st century's first decade in the form of social media.

A social media site is a Web 2.0 tool that allows users to post comments (as well as pictures and video) that are immediately available for the world to see. Among the two most popular social media sites are Facebook (1.23 billion users) and Twitter (243 million monthly active users; Smith, 2014). This combination of a large number of individuals having a mobile technology device alongside social media tools allows instantaneous transmission and receipt of communication to virtually anybody in the world from virtually anywhere in the world.

This marked change in communication is indicative of Martorella's premonition of an interactive Internet, and its power cannot be underestimated. Indeed, scholars have noted the impact that these tools had on communications among revolutionaries in the Middle East and North Africa during the period known as the Arab Spring of 2011 (e.g., Huang, 2011; Khondker, 2011). Huang (2011) noted, "In part by using the social networking sites, activists [in the Arab world] organised and publicised the unprecedented protests" (p. 1).

Mobile Technology in Schools

Although mobile technology devices and social media enabled the active citizenry that took place in North African countries and the Middle East, it is important to investigate the potential of these tools for teaching, and specifically, for teaching social studies in both a United States and a global context.

Applications (commonly referred to as "apps") can be installed on any mobile device. As of this writing, there are "over 250,000 apps to choose from" (Apple Inc., 2012b) for use on an Apple iPad, and a search of the iTunes store (where applications can be purchased) for "history education" yielded 182 results.

Each app has a "very specific functionality" with an overriding goal of "significantly improv[ing] existing functions of [a] device," as they tend to be focused on a specific subject or topic for learning (Sukhanov, 2012). For example, the use of the Explore 9/11 app allows a user to learn about the events of September 11, 2001, by reading and listening to accounts of eyewitnesses, as well as viewing a number of primary source images.

The My Elected Officials app not only gives basic information on a politician that might easily have been found on the Internet a decade ago (e.g., this app shows a user that Congresswoman Nancy Pelosi is a Democrat from California's 8th District). The app also allows a user to see images and video, as well as learn how any given official has voted on any issue (updated in real time), potentially promoting higher levels of Bloom's Taxonomy of Educational Objectives. As a result, Martorella's (1997) notions of data gatherer and interactive Internet have gained more veracity.

Mobile technology literature has initially focused on its potential, and several anecdotal reports have described its use in a variety of educational settings. For example, Schachter (2009) reported on the successes of elementary and middle school students using mobile devices, with one teacher noting, "The students were more engaged. There were less behavioral issues, and the parents were saying that they'd buy their kids this phone before they'd buy a PlayStation" (p. 34).

Mobile technology is being used at an increasing rate in K-12 settings. One recent report noted that perhaps because of their "lower cost, child-friendly nature, and strong offering

of educational apps," in 2011 iPads were purchased at a greater rate than "Mac PC and laptop products in the K-12 education market" (Quillen, 2011).

An example of their use can be seen as the students at Black Hawk Middle School in Bensenville, Illinois, began to use Apple iPads in their social studies courses in August 2011. This initiative was anecdotally deemed a success within the first year. A teacher who used them observed "more conversation, more enthusiasm" among students, and said that "the teacher has more one-on-one interaction." An eighth-grade girl stated, "It's an easy way to learn and have fun at the same time" (Bensenville School District, 2011).

At this stage of development, the number of empirical studies investigating the utility and effectiveness of mobile technology use within the K-12 environment has been limited. Crichton, Pegler, and White (2012) reported on Apple iPod Touch and Apple iPad use among K-12 students in Canada, with the goal of "gain[ing] an understanding of the infrastructure required to support handheld devices in classrooms" (p. 25). Although the majority of students had no experience with these devices, the authors reported that, by and large, students had little difficulty learning how to use the devices themselves.

From an instructional standpoint, elementary and middle school students "demonstrate[d] great enthusiasm" for their use, but high school students, less so (p. 27). Additionally, the authors reported that "teachers have a significantly changed role when using iDevices in their classrooms" (p. 28).

High school social studies students' use of the Explore 9/11 app using an Apple iPad within an 11th-grade United States history course has been investigated. In this study, American high school students reported positive experiences with the iPad itself and were able to develop a sense of historical empathy as they came across the firsthand accounts of seven individuals' experiences on September 11, 2001 (Friedman & Garcia, 2013).

Tenth-grade civics and economics students' use of the Lincoln Telegrams app to study President Lincoln's telegraphic correspondence during the American Civil War was also investigated (Molebash, Lee, & Friedman, 2013). Students reported some images being slow to load at times, yet they reported a successful experience using this app, with no students having technical difficulties and many reporting positive learning experiences as a result of its use. This finding was summarized succinctly by one student who stated that it was "better than a textbook."

Current Practices and Future Trends

Despite the lack of empirical research on mobile technology devices, a wide variety of practice is cropping up in classrooms. One-to-one computing initiatives, such as the one described here, are juxtaposed against districts where mobile technology use among students is banned. A recent Pew Internet study showed that 77% of 12- to 17-year-olds possessed their own cellular telephone (with 23% of these being a smartphone; Lenhart, 2012), thereby enabling one out of every four teens to connect to the wealth of information that Martorella (1997) described. It is an interesting conundrum, as teachers know many students have access, and these students know they have access. Yet, in many schools this learning tool cannot be utilized, at least in an official capacity.

However, teachers are not necessarily prevented from using mobile devices *unofficially*. I am aware anecdotally of an incident when a student asked his teacher what year John C. Calhoun was born. Despite mobile technology being banned in his school, the teacher said to the class, "That's a good question. Do me a favor and look that up on your

phones." Seventeen seconds passed, before a student triumphantly declared, "Got it! 1782!"

A phenomenon is likely taking place with mobile devices that is similar to what occurred with the Internet at the turn of the 21st century. A decade ago, Levin and Arafeh (2002) described a phenomenon of students reporting learning from the vast resources of the Internet outside of school, but not necessarily within it, which they termed a "substantial disconnect" (p. iii). In other words, students in Levin and Arafeh's study took advantage of Internet resources to augment their learning experience, albeit not necessarily in school.

Although discerning if and when one-to-one mobile computing will be the norm in schools is difficult, social studies and technology researchers would be foolhardy to wait until it is the norm before engaging in research. Rather, this moment should be seen as an opportunity to seize, with instructional designers developing education-friendly applications in concert with researchers. Then, researchers a decade from now will not be writing retrospective reviews asking whether mobile computing was a "lost opportunity or unexplored frontier," as they did regarding the Internet in social studies classrooms (Friedman & VanFossen, 2010, p. 51).

Mobile Technology Research Collaborative

Mobile technology devices are well on their way to becoming omnipresent in society, and trends point to this soon being the case in schools as well. However, relatively little empirical research has been conducted on their effectiveness. Therefore, a mobile technology research collaborative that is populated by faculty from around the world might be created to study the factors that encourage and barriers that restrain mobile technology use, how hardware can be provided, and the affordances and constraints of different devices and applications. It could serve as a clearinghouse of different research and teaching ideas.

In 1997, Martorella was correct from a societal point of view in his predictions of the computer serving as a data gatherer as well as the interactive Internet. It cannot be said with certainty, however, that these developments have transformed schooling, in general, and social studies, in particular. Will this field be able to advance pedagogy as a result of the (relatively) newfound materials online and using mobile devices to access and learn with them? Or will these tools serve solely as sources from which we gather information?

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