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Text Messaging and Teenagers: A Review of the Literature

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Abstract

Look around on any bus, in any restaurant, or standing in any line and people are text messaging. Likewise, most teenagers in America are nearly inseparable from their cell phones, not because they are constantly talking, but because they are connecting with their friends through text messaging. Although cell phones are banned in most K-12 schools, students are text messaging constantly there as well. Few adults, including teachers and administrators, understand how and why adolescents and young adults are using text messaging or how to harness text messaging capabilities in the classroom. This literature review examines the limited amount of research on the practice of text messaging for adolescents and young adults (ages 11-21), focusing on the motivation, means, and methods of text messaging. In addition, it considers how adults have successfully engaged text messaging to access and inform youth about health-related issues. In this light, some current educational uses of text messaging are highlighted, along with implications for future research.

Keywords

Text Messaging; Adolescence; Mobile Phones; Mass Media; Education

Introduction

See it? Hear it? Take it! This is still the mantra of many schools across the United States that succinctly summarizes the policy concerning cell phones in schools; in essence, they are banned. Yet, most teenagers in America are nearly inseparable from their cell phones, not because they are constantly talking, but because they are connecting with their friends through text messaging. As a phenomenon, this was originally unprecedented and unpredicted, especially because text messaging capabilities were designed strictly for mobile phone companies to communicate with their customers (Taylor & Harper, 2002). Teenagers, digital natives born into a world rich in technology who take ubiquitous computing for granted (Prensky, 2001), tend to lead the way with most technologies, and text messaging is no different.

According to the International Telecommunications Union (2009), a United Nations agency, there are currently around 4.6 billion mobile phone subscribers across the globe, which is more than 50% of the world's population. Between 72 and 84% of the approximately 41,000,000 American teenagers have their own cell phones, and the percentage increases with age; 38% of those teens send text messages daily (Lenhart, 2009). Recognizing this, it seems that schools are playing ostrich, with their heads in the sand, by not harnessing the power of this medium for purposes of education.

Through a review of literature from diverse disciplines and both scholarly and popular media, I examine three questions:

1. How are teenagers and young adults using text messaging in their everyday lives?
2. How are adults using text messaging to access and inform youth?
3. How can text messaging be used in educational settings?

Mode of Inquiry

Modern cellular phones have countless applications that allow them to act not only as mobile phones but also as music, video, and game players, cameras, global positioning systems, and devices that provide access to the Internet and a host of applications. For this particular analysis, the focus is strictly on teenagers and young adults (ages 11- 21) using the short message service (SMS), or text messaging capabilities. It does not include the use of SMS to post to Facebook, Twitter, or other social networking sites, as that would require the receiver to have access to the Internet to read such messages or post replies.

Empirical research exploring the use of text messaging in formal educational settings is still emerging; therefore, studies from diverse disciplines were examined. The domains of communication and media studies and information technology address the first question investigating how young adults use text messaging. The majority of research into adult use of text messaging to interact with adolescents and young adults comes from the fields of health and wellness and medical journals were primarily utilized. Finally, because there are so few studies on the use of text messaging in education, popular media, professional and practitioner magazines, and books were the sources of real-world applications of text messaging in schools.

Teen Use of Text Messaging

Reasons for Use

Teenagers have adopted text messaging as their primary form of text-based communication, preferring it even over e-mail (Lenhart, 2009); there are several reasons for the popularity of text messaging. First, it is quicker; adolescents have found that by texting, they can forego the normal chit-chat involved in phone conversations. One teen stated that even for a quick question, you'd have to go through the niceties of greetings and spend time talking about other things (Faulkner & Culwin, 2005). Text messaging is also cheaper, because messages are generally charged by the message, not the word count. In contrast, the cost of a phone conversation varies as it is charged by the minute. Also, the location of sender/receiver does not affect the charge. Many teenagers pay their own mobile phone bills, and pay-as-you-go plans allow them to budget more accurately (Faulkner & Culwin, 2005). Finally, many teens state that text messaging is more convenient. Phones can be switched to silent mode, so they do not disturb others, and allows texting to be done surreptitiously and away from parents or teachers (Grinter & Eldrige, 2001).

E-mail is the preferred mode of communication for school or work, but when teenagers want something that is fast, immediate, and can be done anywhere – texting is preferred (Lev-Ram, 2006). For teenagers, the cell phone is almost always with the person, so it is constantly accessible. Being small and silent, the cell phone is easily transported and used furtively under the supervision of authority, as compared to e-mail, which requires a computer (Thurlow, 2003). Many teenagers have reported that they share a computer with family members or that it is in a common area of the home so instant messaging and e-mail can be observed (Faulkner & Culwin, 2005). In addition, because the phone displays both text and sender, the user can choose when and if to respond to a message and has time to compose an appropriate response. Girls, in particular, often invite others to help them compose their responses (Faulkner & Culwin, 2005). Reid and Reid (2004) have also theorized that another part of the attractiveness of texting is the visual anonymity it seems to afford, especially for socially anxious people, as the texter does not need to see/hear the recipient. In addition, it provides almost perpetual contact for those who are lonely. Lohnes Watulak (2010), drawing on the work of Thurlow (2003) and Clark (2005), sites the desire for constant contact as a significant reason for undergraduate students to text during class, even if they acknowledge that that texting is rude and the content is trivial. Finally, texting provides

students with not only communication, but also a way to exert power in situations where they feel they have little control.

Teen and Young Adult Text Messaging Content

Multiple studies in various countries have been conducted on the content of young adults' text messages, with similar results across studies. Many text messages have to do with coordination of events and maintaining relationships. Often a text will be sent to see if the receiver is available for phoning on a land-line, an instant message chat, or a face-to-face meeting (Grinter & Eldrige, 2003). Ling and Yttri (2002) call this "hypercoordination" because, although the basic event has been set, as the event draws closer, texts are sent with last-minute changes, apologies for being late, or checking on details. This indicates a growing desire for teens to be constantly available and flexible.

Content analysis of text messaging has been replicated with similar results, although category names have varied. Thurlow's (2003) content analysis of 544 messages of first-year college students in the United Kingdom classified the content of the messages into nine categories (Figure 1). Informational-practical (14%) texts were requests for information such as the location of something or a statement of activity. Informational-relational (8%) texts included personal favors or intimate information. Practical arrangement texts (15%) dealt with meeting or coordination of activities. Social arrangement texts (9%) were recreational meetings – at a bar, restaurant or other event. Good-night messages and greetings fall under salutary texts (17%) and were generally brief and did not expect a response. Romantic messages made up 9% of messages with an additional 3% being explicitly sexual. The smallest portions of messages were chain messages (communications intended to be passed along to numerous friends) at 2%. Friendship maintenance was the largest segment of texts at 23%, and included support, apologies, compliments, and congratulations. Condensing the categories, Thurlow found that 31% of messages were informational or practical in orientation and 61% involved building and maintaining relationships.
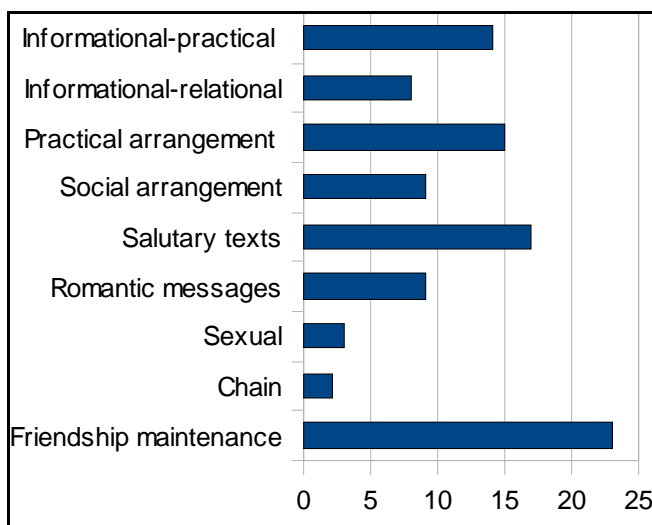
Figure 1: Thurlow Categories (Bars Indicate %; adapted from Thurlow, 2003)

Faulkner and Culwin's (2005) content analysis of 337 messages of college seniors in the United Kingdom classified messages into fifteen categories – they added advertisements and jokes, and divided some of Thurlow's categories. A German study of more than 1,000 messages of adolescents and young adults found similar results, with 54% of messages dealing with maintaining and expressing relationships. Of that 54%, approximately 20% were about appointments, 17% were greetings, 9% initiated other forms of

media contact, 4% were quotations or cute sayings, 3% dealt with relationship maintenance, and 1% were supportive messages (Doering, 2002).

As text messaging has become more pervasive, some changes in the way young adults are using it has occurred. For the first time, Pew Research Center's Internet and American Life Project reports that "Among all teens, their frequency of use of texting has now overtaken the frequency of every other common form of interaction with their friends" (Lenhart, 2010, p. 2), including face-to-face interactions. Although Battestini, Setlus and Sohn (2010) used thirteen very different category labels, their more recent study of 75 undergraduate and graduate American college students found that planning is still the most common content of text messages (31.7%) with relationships, chatting, talking about school/jobs making up the rest of the majority (almost 40%). However, two new categories have emerged. Young people are now using text messages much like social media and texting status updates. In addition, there seems to be a blending of media, as conversations flow from online, to text, to voice. The text messages help coordinate communication as it shifts between media.

A unique ritual has emerged through the use of text messaging – that of the good-night text (Grinter & Eldrige, 2001). Generally exchanged between romantic partners, or through intimate friends, the good-night text has taken the form of the ending of the show *The Waltons* in which each member of the family checks in with the rest before bed. Close friends end the day with quick updates and general good-will messages. The amount and frequency of these simple check-in messages indicates the intimacy level of the senders and receivers, with face-to-face repercussions if the ritual is not completed (Taylor & Harper, 2003). Because of the silent mode of cell phones, the users' parents are generally unaware of this activity, which, in some cases, may last until 3 a.m. As early as 1999, the American Academy of Pediatrics suggested that children's bedrooms should be electronic-media free rooms, which most people think of as television or computers. More recently, pediatricians are finding that even moderate texting after lights out can interrupt teenagers' sleep patterns. In Van den Bulck's study (2007), 62% of adolescents used their mobiles after lights out and the higher intensity of use predicted higher levels of tiredness, even after abstaining from late-night texting for a year.

Teen and Young Adult Text Messaging Practices

The popular media and adults tend to condemn how textish (text language with abbreviations and symbols) has taken hold. In the teacher's lounge, complaints abound about how 'b4' (before) and 'gr8' (great) show up in homework assignments. In addition, many purists, teachers, journalists and parents believe that the use of text messaging will be the decline of the English language, as columnist Brian Anderson (2008) wrote, "I'm not sure we can overcome our cell phone-armed teens" (p. 24). However, research indicates that the extent of textish is not as prevalent as the media would have the public believe. In addition, the prevalence of email, instant messaging and text messaging may be increasing students' writing capabilities through sheer quantity (McCarroll, 2005). Several columnists have commented that part of modern teenage culture is the blurred line between formal and informal language. With the prevalence of computer mediated communication, teenagers are treating most situations as informal. This may actually be a natural shift in language, as was seen during Elizabethan times with Shakespeare and the Great Vowel Shift (Stockwell, 2002) and later in the 1700s with the codification of spelling. However, many teenagers state they know when to use textish and when it is inappropriate. Some researchers think that by using other genres of communication, teens can express their individuality, learning potential, and creativity better than by traditional means. When teenagers transition to college, most young adults automatically drop the adolescent view of language and write more formally because of class requirements (Baron, 2005; McCarroll, 2005; Sternberg, Kaplan, & Borck, 2007). Furthermore, Drouin and Davis (2009) showed that there was no significant difference in standard literacy scores between those who use textish and those who don't.

Teenagers' texts are not written in an unintelligible teen code, according to Grinter and Eldridge's (2001) content analysis of 477 messages by 10 teenagers in the United Kingdom. The teens logged their texts and participated in discussion groups to explain their usage. About 40% of their texts included abbreviations, with over half of them being dropped letters or known abbreviations (e.g. min for minute).

Thurlow's (2003) content analysis of freshman college students' messages found that only about 20% of their content was abbreviated, or used emoticons or non-alphabetic symbols. In addition, Faulkner and Culwin (2005) also found a low incidence of textish when they studied 24 message diaries kept by college seniors in a computer course at a university in the United Kingdom. The researchers suggested that the availability of auto-complete (predictive text) reduced the need to eliminate letters. In addition, Kasesniemi and Rautiainen (2002) found that teenagers use more formal text language with more distantly social people – so friends' messages may include more textish than messages to acquaintances and adults. However, at the same time, the longer a teenager had a mobile phone, the more likely textish was to be used within their circle of friends. A German study found that there were fewer incidents of textish in text messages than in the German-language daily newspapers. Most of the abbreviations used were typical in regular writing (Doering, 2002).

Few people send a text message without expecting a response, yet unlike face-to-face communication, the response may not be immediate. Some studies have investigated the length, timing, and amount of simultaneous conversations that happen between contacts. Grinter and Eldridge (2001) defined a conversation as a string of up to twelve messages between sender and receiver, and in which the texters were taking turns - suggestive of instant messaging. In this study, less than half of the messages recorded were part of conversations and few were overlapping or multi-tasking conversations. However, in the discussion groups, the teenagers expressed that they often used multiple media simultaneously (instant messaging, email, landline and mobile), frequently using one to coordinate the use of another. The majority of the messages were single messages, often imitating a practice called 'sticky noting', i.e. sending a reminder to others or self to do something. However, Battestini et al. (2010) defined a conversation as "at least one incoming and one outgoing message" with a 20 minute response time. Using this definition, they found that the average conversation contained approximately five messages and almost 73% of messages were part of a conversation, a significant difference from Grinter and Eldridge (2001). The reasons for this discrepancy are unclear, but it could be a combination of factors. Battestini et al. (2010) had direct access to all text messages between participants, whereas Grinter and Eldridge had to rely on self-report. In addition, in the ten years between the two studies, cell phone ownership for teens had changed from 45% in 2004 to 75% in 2010 (Lenhart, 2010) which means young adults have more people they can text. According to Battestini et al, simultaneous conversations through text messaging are becoming more frequent.

Text messaging has become the preferred method of communication for many teens, with actually calling their friends on the cellphone being the next preferred method (Lenhart, 2010). Does the method make a difference to teens? Reid and Reid (2004) compared how Texters (who use their cell phones mostly for texting) and Talkers (who use the cell phone for mostly talking) actually used their phones. In addition, they investigated how socially anxious and lonely each group appeared. Texters tended to locate their real selves (i.e. how they would describe themselves) within the text, but this persona was different from how their friends or family would describe them. In contrast, Talkers believed their real selves were the ones portrayed in person or by voice. Texters were also more likely to rate higher in social anxiety and loneliness than Talkers. The study indicated that the majority of text messages circulated within a "text circle" of regular contacts and in continual conversation for the Texters. Grinter and Eldridge (2001) also found that their participants had a text circle which consisted of between two and ten regular contacts. Although the participants of Battestini et al's (2010) study had contact with about 47 different people, regular communication occurred with only about 5 people. This would seem to indicate that, although text contact with acquaintances is acceptable, the majority of contact is with more intimate friends or family members.

The Future of Text Messaging Technology

An adolescent technology itself, text messaging is not even 20 years old and, like any teenager, its personality is still developing. Usage is climbing dramatically and new uses for texting are also increasing. Teens want to create a text identity and they complain about the lack of personalization, expressiveness and context when texting (Amin et al., 2005), and attempts have been made to introduce multi-media to messages with varying success. SenseMS was an early solution that hoped to remedy these issues by

allowing the texter to add an avatar (computer graphic representation) with different facial expressions to indicate emotion, a background to indicate location, and enhanced text. In a prototype study, teens enjoyed sending and receiving the SenseMS messages, but in reality would not use it frequently. Including the extra information in each text was time-consuming and users thought it was reserved only for special messages. Also, the background did not always indicate location; it was just a cool picture. In addition, the text features did not necessarily enhance understanding of the message (Amin et al., 2005).

A Finnish company launched a beta test for Comeks Shorts. This software turned plain-text SMS messages into animated characters talking in comic balloons. Both sender and receiver must have the software and phone for it to work; otherwise a message is just displayed as a normal text message (Schonfeld, 2007). In a pilot study of multimedia messaging services (MMS) in Finland, Kurvinen (2003) focused on using pictures and text and how this capability encouraged different forms of messaging, specifically teasing. In strictly text-based messages, emotion and tone could not be determined as easily. However, by attaching pictures, the tone became clearer. Attaching multimedia is more common-place today, though both sender and receiver often must have compatible phones and carriers.

With the rise of text messaging, traditional web advertisements are moving to text message ads. However, at this time carriers and governments restrict what kind of ads can be placed. Also, with limited text length, advertising campaigns must be carefully designed (Lev-Ram, 2006). However, if marketers want to reach the $80 billion market of the 14-24 age group, they will have to adapt (Schiff, 2007). Some advertising research has shown that consumers feel that text-based ads are too intrusive on a device that is considered intimate and personal, so there is a fine line between informing consumers and alienating them (Wilson, 2006). Charities and nonprofit organizations have already harnessed the power of texting as evidenced by the 13% of Americans who gave text-message gifts of money to relief groups for the Haiti earthquake victims (Wallace, 2010).

Because many teenagers consider the texts they receive as meaningful and an embodiment of the sender, scrap-booking of archived texts will become important, i.e. being able to save, retrieve, and print the messages. Currently, some of these functions are moving to the computer, where the user can download and manipulate information. In addition, being able to exchange information easily allows for more shared experiences (Taylor & Harper, 2002). To do so, many mobile phones do now have removable memory cards, yet for the average teenager this may still be too costly, and others may not have the same capabilities. Handheld computing devices allow for wireless synchronization between users, which could be a potential design for mobile phones.

As the hardware and software for cell phones change, so will their capabilities. More and more cell phones have QWERTY keyboards, which reduces the need to abbreviate in texts and allows for more complete thoughts. Speech-to-text software is advancing and will enable the user to orally dictate the text message. As fears of identity theft and surveillance increase, the desire for encryption software will also increase.

Adult Use of Text Messaging to Access and Inform Youth

People have sardonically observed that a teacher from 100 years ago could walk into a modern classroom and begin teaching without missing a beat. According to Fulton, "Classrooms of today resemble their ancestors of 50 and 100 years ago much more closely than do today's hospital operating rooms …" (1989, p. 12). Within the context of this article, the medical world has much to teach educational institutions about taking advantage of the features of SMS, as the medical field has quickly adopted text messaging programs to communicate with typically hard to reach populations; provide important, but sensitive health related information; increase attendance for appointments through text reminders; and extend support for smoking secession, weight loss, and various disease management programs.

Text messaging provides visual anonymity for the sender and receiver, which may allow increased self-disclosure (Joinson, 2001). For health professionals, this can be useful in reaching out to adolescents about stigmatized issues to provide support and information. For example, depression in adolescence is not an unusual event; however, only about 20% of depressed teens seek professional help. Joyce and Weibelzahl (2006) designed a three-phase program using text messaging to encourage youth to seek help, and receive text support and diagnostic tests. Through *Youthlink*, a mental health outreach service in Australia, young adults have constant and direct access to their therapists, though the majority of contact involves micro-coordinating face-to-face meetings (Furber et al., 2011). Sex is another stigmatized topic, and accessing accurate information about sex is often difficult for teenagers. In San Francisco, two agencies worked together to create a text messaging service called SexInfo to increase teenagers' awareness of symptoms of sexually transmitted diseases and the availability of free clinics. The target audience consisted of African American teenagers, who historically have a higher incidence of sexually transmitted diseases. Research found positive awareness of the campaign and indicated that text messaging could be a way to reach a typically difficult-to-reach population (Dobkin et al., 2007). Since that time, similar programs have been initiated across the country, such of BrdsNBz in North Carolina, Text 2 Survive in Illinois and Hookup 365/24-7 in California (Kelly, 2010). The Burnet Institute in Australia reported a significant increase in sexual health knowledge and testing for sexually transmitted diseases (STD) for the participants in their four month study using SMS messages for education about STDs (Gold et al., 2010).

Failure to attend medical appointments increases the cost of medical care; however, phone calls or mailed reminders are also expensive and time-consuming. Text message reminders can increase appointment attendance and are more cost effective. When a children's hospital in Ireland implemented a text messaging reminder system, it decreased the non-attendance rate by over 10% and because the system was computerized it was a cost-effective and efficient supplement to current practices (Geraghty, Glynn, Amin, & Kinsella, 2007).

Text messaging also provides an efficient, effective, and inexpensive way to assist patients with chronic illnesses or longer-term support programs. When text message support is added to a smoking secession program, it can increase the quitting rate. A study of New Zealanders over the age of 15 indicated that adding text messages with hints, support, and distractions to traditional supports such as gums, patches, and groups increased the quitting rate. The messages included health information, quit buddies, distractions (news, quizzes), and the ability to request texts when a craving hit. At six weeks, participants using text messaging services had a 15% larger rate of cessation than traditional supports, and that rate remained higher six months later. Although text messaging cannot replace traditional therapies, the messages were affordable, personalized, age appropriate, and not location-dependent, unlike written materials (Rodgers et al., 2005). Chronic diseases, like diabetes, often make teenagers feel out of control. To properly manage the disease, diet, exercise, blood sugar, and insulin need constant attention to prevent insulin shock and hospitalization. A text message program entitled Sweet Talk targeted youth ages 8-18 with Type I diabetes to increase their self-efficacy and proper use of insulin therapy. The messages included reminders and hints about injections, testing, and healthy lifestyle choices. Patients using Sweet Talk reported a greater sense of self-efficacy and adherence to proper management. In addition, they felt more supported by their medical team and were more likely to use health services when needed. At the end of the study, 81% of those receiving Sweet Talk services believed it helped them manage their disease and 90% wanted to continue services (Franklin, Waller, Pagliari, & Greene, 2006).

The success of these various interventions builds on the affordances of texting technologies – immediacy, anonymity, constant contact, and accessibility. When teenagers do not want to discuss an issue or disease face-to-face with an adult, text messaging seems to be a feasible option to increase communication and dissemination of vital information. Cell phones make information constantly available and accessible. In addition, they may help young adults be more active agents in their own health care. These same qualities could help educational institutions to access, inform, and connect to youth and their parents.

Implication for Schools

For many K-12 schools, cell phones are the enemy and must be left at home, deposited at the office, or turned off. However, some teachers and schools are embracing the unique features of text messaging to connect with students both inside and outside of the classroom.

At the institutional and classroom levels, text messaging with students and parents can increase attendance and participation in educational activities. Schools, from elementary to university, are using texts to inform parents about student truancy or alert students about emergencies or school closings. The texts have cut unauthorized absences by 50% in many schools in the United Kingdom, just by being able to contact parents immediately when a student does not show up for school (Smith, 2006). In the past, school office personnel would contact parents via phone call or postal mail, which could delay notification for hours or days. Many school districts and institutions of higher education have also been providing opt-in text message notifications of school or class cancellations or emergency alerts (Carnevale, 2006).

In addition, some teachers have found ways to incorporate the use of texting into lessons. Thomas, Orthober, and Schultz's (2009) study of three high school language classes asked teachers to text students about course-related topics. In general, the students found it beneficial. In addition, Crisp's (2009) study showed that sending specific course-related assignment text messages to both students and parents significantly increased assignment completion. At the University of Pretoria in South Africa, engineering students perform their community service hours as tutors for primary and secondary math students using a text message-based application entitled Dr. Math using Mxit (a chat program within text messaging). To encourage students to voluntarily play math drill games, the games were incorporated into a text adventure quest game. In general, the players were more motivated to complete more difficult math calculations within the structure of the game than without the game (Butgereit, 2009).

Although adults are still debating the benefits and drawbacks of text message writing, using textish or text speak can be a valuable tool for teaching languages, and there is some evidence that use of text messaging may support phonemic awareness. Using textish is motivating as a real-life experience in the language, but also supports complex understanding of the language, as the abbreviations are often based on slang and pronunciations of words and the user must understand the context of the conversation (López Rúa, 2007). Plester, Wood, and Joshi (2009) found that use of text messaging in children aged 10-12 may increase their reading ability through increased phonological awareness, vocabulary, and generally more practice in reading text. Moreover, understanding the variants of a language (formal vs. informal; dialects; jargon) along with the appropriate context and use of the variant is a critical skill for the future (Carvin, 2006).

Librarians and teachers alike should be aware of the new forms of literature that have emerged to take advantage of SMS capabilities. In 2008, several text message novels hit the best-seller list in Japan. Conceived earlier in the decade, these text message novels were written on cell phones and uploaded to a website that distributed the texts to subscribers. Each installment of the novel was under 170 characters long, yet led to a fully developed plot of a novel, later published as a book (Onishi, 2008). This has become an international phenomenon, with cell phone novels being distributed in India, China, South Africa, Austria, Egypt, and elsewhere (Martin, 2009). Related to this development is the Shuttleworth Foundation's creation of the m4Lit (now known as the Yoza) Project (http://yozaproject.com/about-the-project/) in 2009 to promote literacy in South Africa through mobile novel (m-novel) development. Since that time, three novels have been published and over 34,000 readings of the stories occurred in the last year (m4Lit Project, 2010). Although not fully adopted by American readers, this genre has the potential to provide an authentic audience for young writers that could increase voluntary, recreational reading among youth with ubiquitous e-text readers.

As teachers become more comfortable with cell phones in their classrooms, they will find several websites and activities to help them integrate educational activities with text messaging and increase interactivity. Poll Everywhere (http://www.polleverywhere.com/) allows users to create polls, including more extensive text answers which can be shown anonymously, allowing students to examine various

viewpoints without being embarrassed in public. SVNGR (http://www.scvngr.com/) is a website that allows teachers to create scavenger hunts via text message, which could be used on field trips, in museums, or even while reading a book. The various features of the program allow for different time limits, starting points, and difficulty levels. ChaCha (http://www.chacha.com/) is a mobile answers text messaging service that answers questions by text message. Although the service is free, it does have commercial advertisements following the answer, but the answers themselves are written by real people. This could be a helpful service for students as they begin an inquiry-based project or need information during a field trip. In addition, some Internet and software companies are beginning to build the use of cell phone text capability into their classroom response systems (CRS). Cheaper than buying an entire system with a computer, clickers, and software, a cell phone CRS encourages students to use their own devices to respond to polls and surveys. Teachers can create simple polls to assess background knowledge of a subject or pop quizzes to check for understanding during class. More universities are also supporting the use of Classroom Feedback Systems. For example, using customized software, instructors received SMS messages from their undergraduate computer science students during class presentations. For the students, this provided an anonymous way to ask questions and gave instructors immediate feedback to their presentations. This increased the number of student questions, and also student interest and motivation (Markett, Arnedillo Sánchez, Weber, & Tangney, 2006). Scornavacca, Huff, and Marshall (2009) also found indications that providing opportunities for anonymous and immediate response may increase classroom engagement and participation in large lecture-based classes.

Few people use cell phones strictly for talking or texting, and some teachers are beginning to incorporate the wider range of technologies built into the cell phone for learning activities. While the topic is beyond the scope of this article, it is interesting to note that scholars like Kolb (2008) assert that cell phones can and should be used as learning tools as they bring student culture into the classroom, connect everyday digital culture with classroom culture, provide for innovative learning, and help students learn digital etiquette needed in the future. Her book *Toys to Tools* provides a rationale and lesson plans for using cell phones for podcasting, conferencing, creating multimedia projects, and as management tools for research projects and personal organization. As cell phones continue to evolve, the capabilities will continue to increase, and it is imperative that new and veteran teachers alike recognize the potential of these devices for learning.

Although schools still seem to resist mobile devices in the classroom, parents may more supportive. According to a poll by SpeakUp (2011) of over 42,000 parents, 63-70% would be willing to purchase a mobile device and 51-58% would purchase a data plan with Internet access if the mobile devises would be used effectively in the classroom, and "a majority of parents believe that mobile devices can help extend learning beyond the school day" (p. 12). With reduced budgets for schools, the Bring Your Own Device (BYOD) may be a feasible solution for schools attempting to provide one-to-one computing and mobile-based experiences (Schachter, 2009).

Implications for Future Research

Significant research has been conducted on the use of text messaging and adolescents and young adults in the medical field, sociology and information technology; yet education is still lagging behind. To fully support the use of text messaging in schools, teachers need to know the benefits and drawbacks of it as an educational tool. We need more research into the following:

1. What role does and should text messaging have in schools?
2. What impact does long-term use of texting have on youth literacies?
3. Can text messaging increase students' reading and writing abilities in ways not currently addressed through traditional means?
4. Can text messaging reminders increase student participation and achievement without aggravating the already prevalent digital divide and teacher workloads?
5. If cell phones become an accepted educational tool like pens and calculators, will the dire predictions of increased distraction and poor language use come true or will cell phones become as common-place as overhead projectors and what are the implications of this?

Conclusion

Understanding how young adults use text messaging in their everyday lives has implications for a continuum of issues from the micro level of daily relationships with the adults in their lives to the macro level of policy decisions at school and district levels.

At the micro level, parents and teachers need to appreciate the paradox of the ubiquitous yet surreptitious use of cell phones by young adults. Through dialog, adults need to help teenagers make positive choices on when, where, and how text messaging is done. At home, this may require teenagers to turn in their cell phones before bedtime to ensure a good night's sleep in preparation for the next day. In school, teachers need to recognize that texting is happening in the classroom, no matter what their school policy states. This subversive use can be turned into condoned and supervised use through implementing phone-based technologies such as response systems in the classroom, or integrating place-based activities which take advantage of the affordances of mobile technology, including texting. As unlimited text and data plans become more common in the United States, this will be more feasible. It is clear from the various medical studies cited here that directed use of text messages can influence a young person's health-related problem solving and decision making abilities, which could also be leveraged in educational settings. In addition, text messaging is often a collaborative activity that impacts the way teenagers learn to interact with the world. Schools should consider the necessity of helping guide students through this process in order to foster healthy and productive outcomes. This requires more than a list of rules and consequences, but rather a long-term plan to help students develop digital citizenship skills – the thoughtful, knowledgeable, responsible and ethical application of technology in appropriate situations (Ribble, 2009). Lohnes Watulak (2010) suggests that schools need to look beyond leveraging mobile technologies as learning tools, but rather "find ways of building on students' ability to bridge spaces and places and to create and maintain networks and relationship via text message" (p. 204).

Early cell phone policies in schools assumed a detrimental effect of the devices on student learning and behavior and sought to limit student use of the technology. However, as both cell phones and societal use of cell phones has evolved, a thoughtful look at current school and district level policies related to mobile phones is needed, which includes an understanding of how students use them. Banning cell phones in school may, at the surface level, alleviate the potential distraction of having them, but in reality it just forces the subversive use of texting under the desk or in the bathroom. Instead of modeling and instructing students on proper personal and professional use of this 21st century communication tool, students are forced to rely on their peers for information and instruction. With cell phones and text messaging quickly becoming an integral part of a young adult's identity formation, educators also need to carefully consider the pros and cons of banning these activities, thereby disregarding and possibly alienating an already disenfranchised generation of learners. Ultimately, parents and educators need to better understand young adults' use of cell phones so that they can help younger generations learn how to use these mobile devices in acceptable and responsible ways. This is especially true as cell phones are here to stay, and are already playing an irreversible role in shaping young adults' lives.

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