

Student Reflective Perceptions of High School Educational Cell Phone Technology Usage

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Abstract

High school students are prohibited from using cell phones during the school day within most public schools in the United States; the majority of students, however, maintain possession of a personal cell phone within the high school setting. Most administrators and teachers regard cell phone possession and usage as a negative distraction and deterrent to learning rather than as an educational learning tool. This study investigates college freshman students' reflective perceptions of potential high school utilization of cell phones by students and teachers as educational learning tools. Positive response from surveys suggests there is interest in and potential for educational implementation and use of cell phones as learning tools in schools. Perceptual gender differences were uncovered suggesting further study is necessary before successful implementation can occur.

School policy regarding cell phones, within the majority of public schools in the United States, is generally quite prohibitive and requires students to leave their cell phones at home or turn them off and leave them in their lockers during the school day (Obringer & Coffey, 2007). Other schools report changing policy from banning cell phone use to allowing students to use them before or after school (St. Gerard, 2006). As a result of the rapidly occurring technological advances within the cell phone industry, schools have been hard pressed to make and keep current educational policy regarding the use of cell phones (Obringer & Coffey, 2007).

Students' personal and social cell phone use has been well established, but how do high school students reflect on the usage of such phones in an educational setting? Determining student perception toward using the educational technological capabilities of cell phones within a learning environment is a first step. Knowledge of students' attitudes could possibly lead to, aid in, and influence future decision making regarding the implementation of cell phone use for academic purposes within high school classrooms.

Literature Review

Administrators and teachers often regard the use of cell phones by students at school as a deterrent to student learning (Johnson &

Kritsonis, 2007). Administrators often are concerned about inappropriate use of cell phones in schools and this is the major cause of restricting their use (Obringer & Coffey, 2007; St. Gerard, 2006). Cell phones ringing during a class time present unwanted distractions and, for some students, sending or receiving text messages can lead to cheating (Gilroy, 2003). The existing possibility of posting improper photos on the Internet is also a cause for concern (Obringer & Coffey, 2007). For these reasons, students are not allowed to visibly possess cell phones within most high school classrooms. The challenge faced by many administrators is to effectively balance the needs of the school with the demands of the students and the parents.

Parents characteristically agree with school policy and want their children to abide by the rules (Obringer & Coffey, 2007). In contrast, regarding school emergencies or schedule changes, parents have often demanded immediate communication, which cell phones can provide (Johnson & Kritsonis, 2007; Obringer & Coffey, 2007). Parents report safety as the primary reason for supplying their children with cell phones, whereas children place a greater value on the technological capabilities of the cell phone and its potential to facilitate socialization (Johnson & Kritsonis, 2007; Obringer & Coffey, 2007).

According to Prensky (2001a), students of today are referred to as "Digital Natives." They have grown up with technology and multitasking, and they are in the habit of processing information quickly (Prensky, 2001a). Digital Natives want to be involved in active learning as opposed to sitting passively in class (Prensky, 2001a). They thrive on interactive technology, for example, tools like the cell phone (Prensky, 2001b; Prensky, 2005). Instructors may miss an educational opportunity if they do not incorporate cell phone use into their learning process (Prensky, 2005).

Many teachers in a number of foreign countries already use cell phones as a learning tool (Librero, Ramos, Ranga, Trinona, & Lambert, 2007; Prensky, 2005). Often in remote areas connections to the Internet via cell phone are easier to access than connections via computer (Shinn, 2009). In these instances, cell phones are also less expensive to use (Shinn, 2009).

Some teachers in remote areas have been forced to abandon the practice of supplying one laptop per child as a result of increasing costs (Norris & Soloway, 2009). In the United States, administrators and teachers are finding the costs to continually purchase, repair, and upgrade computer technology to be overwhelming; thus, cell phones have become more appealing (Norris & Soloway, 2009). As the number of services provided by telecommunication companies increases and cell phone technologies advance, the more likely it becomes that students will have fingertip access to learning opportunities, anywhere, anytime, and at a reasonable price (Houser, Thornton, & Kluge, 2002). Cell phone portability, online access, and device applications could allow and encourage students to enhance learning opportunities and group collaboration (Chen, Chang, & Wang, 2008)

Gender differences in computer technology applications have been studied and documented. According to Willoughby (2008), boys and girls who had access to a variety of computer technologies tended to use them for differing purposes and in differing amounts of time. High school males were reported to spend more time on the Internet and engaged in computer games than time spent by high school females (Willoughby, 2008). The overall amount of time engaged in technology by males could influence their perception and possibly increase their comfort level with technology applications within the school setting. What needs to be determined is whether there is a difference in male and female students' perception of cell phone use in education and if student interest to use cell phones as educational learning tools within the classroom exists. Determining answers to these questions may uncover underlying factors that may need to be considered and addressed before implementing cell phones as learning tools within the high school classroom. Differences in gender perception may necessitate varied forms of pretraining before implementation can take place.

Despite the cell phone's enormous potential, how students view their high school's current cell phone policies, their use of cell phones within the school setting, or their use as an educational learning tool is unknown. Before a school system adopts cell phones as learning tools, student perceptions should be investigated.

Purpose of Study

The purpose of this study was to investigate college freshmen's reflection of high school cell phone usage policies, the perception of cell

phones as possible educational learning tools, and the potential perceptual differences by gender. College freshmen's reflective perceptions of cell phones used as learning tools initiated by high school teachers and usage as learning tools initiated by high school students were studied.

Method

Participants

Participants were 166 college students currently enrolled in one of nine sections of a semester-long, face-to-face, introductory university student success course in an upper-Midwestern university. One hundred and sixty-one participants (83 males and 78 females) completed the survey. Five surveys were excluded due to incomplete information. Current academic standing of the 161 respondents was as follows: freshmen (142), sophomores (11), juniors (5), and seniors (3). Because this study investigates the reflective perception of high school cell phone use, only the 142 freshmen (72 males and 70 females) respondents were used for the analysis.

Demographic Information of Freshman Sample

	Freshman $n = 142$	
	Count	%
Gender		
Male	72	50.7
Female	70	49.3
Age		
20 and under	133	93.7
Over 20	9	6.3
Academic Standing		
Freshman	142	100.0
Cell Phone Possession		
Did have	137	96.5
Did not have	5	3.5

Table 1. Demographic Information of Freshman Sample

Instrument

A twelve-item Institutional Review Board-approved survey containing three constructs was developed. Four survey questions comprised each of the following constructs: perception of fairness of school cell phone policy, perception of teacher initiated educational cell phone applications, and perception of student initiated cell phone educational applications. Responses were based on a six-point Likert-type scale with the neutral response omitted. Respondents selected one of the following responses for each question: strongly disagree: 1; disagree: 2; slightly disagree: 3; slightly agree: 4; agree: 5; strongly agree: 6. Construct one contained four questions regarding recollection of high school cell phone usage policies and the respondent's perception of policy fairness. Construct two contained four questions regarding student perception of teacher-initiated cell phone usage applications as

**Table 2. Average Scores for Survey Questions
(1=Strongly Disagree, 6=Strongly Agree)**

Satisfaction School Policy			
q1.	While attending high school, I was aware of my high school's cell phone policy.	142	5.7 0.9
q2.	I felt my high school's cell phone usage policy was fair.	142	3.7 1.6
q3.	In my high school, I felt I could use my cell phone at any time.	139	2.8 1.6
q4.	I felt the consequences for using my cell phone during high school hours were fair.	141	3.4 1.7
Perception as Teacher Initiated Learning Tool			
q5.	I think cell phones could be used in high school as an educational learning tool.	141	3.7 1.5
q6.	I think cell phones could be used in high school by students to participate in surveys.	142	4.1 1.5
q7.	In my opinion, cell phones could be used in high school by teachers to provide feedback to students.	141	3.7 1.6
q8.	In my opinion, cell phones could be used by students in high school to compete in an educational activity.	141	3.6 1.5
Perception as Student Initiated Learning Tool			
q9.	In my opinion, cell phones could be used in high school by students to obtain peer tutoring.	141	3.9 1.4
q10.	I think that cell phones could be used in high school by students to submit assignments to teachers.	141	3.2 1.6
q11.	In my opinion, cell phones could be used in high school by students to collaborate with other students on class projects.	142	4.6 1.3
q12.	In my opinion, cell phones could be used in high school by students to seek teacher assistance on assignments.	141	3.9 1.6

an educational tool. Construct three contained four questions regarding perception of educational cell phone usage initiated by students to disseminate information between students and teachers or among fellow students. Included on the survey were additional check-list-type items including: grade level, gender, age (20 and under or over 20 years of age), high school cell phone status (have or do not have), and types of high school cell phone application usage.

Cronbach's alpha was used to measure internal consistency of the constructs. The reliabilities of reflective student perceptions of policy, teacher use, and student use were measured at 0.539, 0.873, and 0.827, respectively. For further statistical analysis, a factor analysis was conducted to determine interrelationships among the items of each of the three constructs (perception of policy fairness, perception of teacher initiated use, and perception of student initiated use). The principal axis method was used to extract components, followed by a varimax (orthogonal) rotation. It was determined that question one in the first construct did not relate to fairness of policy and was removed, leaving questions two, three, and four within construct one. Cronbach's alpha of the newly configured construct using questions two, three, and four measured at 0.603.

Procedure

Surveys were administered to a random pool of students enrolled in one of nine sections of an introductory university student success course over a two-day period. Sampling was conducted on a voluntary basis by the course instructor at the end of each class period. Participants were instructed that the survey was voluntary and asked to answer as many of the questions honestly with the option of stopping at any time. Principal investigator contact information was provided for further questions or inquiries regarding the study. The pool comprised a mixture of 166 participants from each of the four classifications of undergraduate academic credits earned by freshman through seniors. An approximate equal number of male and female students were sampled. Data were analyzed using Predictive Analytics Software Statistics 18 (PASW®). An independent-samples t test was conducted. The significance level was set as .05.

Results

Survey completion rate was 97% of the 166 participants surveyed. Because the intent of this survey was to determine the perceptions from recent high school graduates, only participants who categorized themselves as freshman (85.5%), 142 of the 166 total respondents, were included in data analysis. As shown in Table 1, of the 142 freshman survey participants, 50.7%

were male and 49.3% were female. Most of the participants (93.7%) were 20 years of age or younger. 137 participants or 96.5% reported having possession of a cell phone during their high school years.

Individual questions listed within each of the three constructs including the number of respondents, mean, and standard deviations are shown in Table 2. The question with the highest percentage of some form of agreement and the question with the highest percentage of some form of disagreement fell within construct one. Question one, which read, "*I was aware of my high school's cell phone policy,*" reported the highest mean of 5.7. Eleven of twelve questions reported a higher average percentage of some form of agreement than some form of disagreement. The exception was question three, which reported a higher average of some form of disagreement. The mean for question three, "*I felt I could use my cell phone at any time,*" was 2.8.

In addition, the researcher investigated differences in perception between freshman male and freshman female respondents in regard to high school cell phone usage as an educational learning tool. The survey items categorized into each of the three constructs were averaged and further analyzed to compare differences of means between genders by utilizing an independent-samples *t* test.

Construct one, policy, was analyzed by averaging questions two, three, and four. An independent-samples *t* test was calculated comparing the mean score of respondents who reported themselves as male to the mean score of respondents who reported themselves as female. The mean for all participants was 3.31; in addition, the mean for males was 3.27 ($sd = 1.406$), and the mean for females was 3.35 ($sd = 0.999$). The mean difference between males and females was 0.08. No significant difference was found, $t(140) = -.397, p > .05$.

Construct two, teacher initiated use, was analyzed by averaging questions five, six, seven, and eight. An independent-samples *t* test was conducted comparing the mean scores of male respondents and female respondents. The mean for all respondents was 3.77; in addition, the mean for males was 4.07 ($sd = 1.295$) and the mean for females was 3.46 ($sd = 1.187$). The mean difference was 0.30. This was found to be statistically significant, $t(140) = 2.901, p < .05$.

Construct three, student initiated use, was analyzed by averaging questions nine, ten, eleven, and twelve. An independent-samples

t test was conducted to compare the mean scores of male respondents and female respondents.

The mean for all respondents was 3.91; in addition, the mean for males was 4.22 ($sd = 1.222$) and the mean for females was 3.60 ($sd = 1.116$). The mean difference was 0.62 and found to be statistically significant, $t(140) = 3.129, p < .05$.

Discussion

This study was conducted to determine students' reflective perception of cell phone policies and possible use as an educational tool within the high school setting. Although the respondents reported a higher percentage of some form of agreement in regards to the majority of items within the policy construct, having been removed from the high school setting for approximately five months and having been exposed to the less restrictive college environment where cell phone usage was more prevalent may have unintentionally influenced their reflections. Current high school student perceptions may not have yielded such favorable results. High school students who were aware of their high school cell phone policies may or may not have viewed them as favorable.

Results uncovered in the investigation to determine gender effect or influence on the students' perception revealed an overall positive reflective perception regarding the usage of cell phone technology in secondary education. Males responded with a statistically higher degree of acceptance toward cell phone use initiated by teachers-to-students in education and by students to collaborate with other students. These findings could indicate that males were more receptive to communicating indirectly through technology rather than directly by face-to-face communication. Igarashi, Takai, & Yoshida (2005) reported that face-to-face communication was more highly valued by females than by males. By implementing the use of cell phones in the classroom, some students may feel a higher level of comfort responding through technology rather than in person. Another possible interpretation of higher acceptance by males relates to gender differences in technology use with males historically overrepresenting occupational fields that involve math, science, and technology (Mammes, 2004). Instructors should be mindful of these possible gendered influences regarding the use of technology in the classroom and recognize that some students may feel more comfortable than other students using cell phone applications and technology. Therefore, instructors may wish to consider the use of this type of technology in the classroom as an option rather than as a requirement.

Although this study has shown significant differences in perception by gender, some limitations do warrant further study. This study has not specifically included the perceptions of actual high school students, post high school students that did not go on to attend college, or individuals of different ethnicities, nor has it shown how culture affects perception of cell phone use as learning tools as studied in the Philippines and Mongolia (Librero, et. al., 2007). This study was limited to only one school, which represented the perceptions of first-year academic standing college freshman students who possessed their own cell phones and did not shed any light on the perceptions of foreign students in foreign countries, where use has been more prevalent and research on technology use in education has been more abundant (Campbell, 2007).

Although students today have grown up surrounded by technology, only during the past decade have schools begun to integrate the use of technology within the curriculum (Kim, Holmes, & Mims, 2005; Prensky, 2001a). The introduction of technology in education at lower grade levels translates to a considerable increase in the number of years a student will have been exposed to technology upon reaching high school. Therefore, it is imperative that research be continued in the area of educational technology and student perception.

Further studies should be conducted that explore the perception of students currently enrolled in high school courses and their perceptions of cell phone usage as teaching and learning tools within the classroom. Research is also needed to analyze school administrator, faculty, and community perception of cell phone use in an educational setting in order to determine whether or not their implementation would be feasible.

Policy regarding cell phone use by students in school will not change unless studies indicate that administrators and faculty also view them as valuable learning tools. With further research, it is possible that cell phone policy can be changed, allowing cell phones to be used within schools by students not only for socialization but also as a valuable learning and resource tool between students and teachers (Kharif, 2008). Cell phones are not going away. Cell phones can be used as a learning tool for knowledge construction if educators teach students how to use them appropriately (Kolb, 2006).

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Student Recollection of High School Cell Phone Usage Survey

Please take a moment to complete the survey below. Participation is voluntary and participants must be age 18 or older. The purpose of this survey is to assess student opinions of cell phone usage in **high school education**. I appreciate your time and willingness to participate.

<p>1. In <u>High School</u>, I used my Cell Phone for:</p> <p>Check all that apply.</p> <p><input type="checkbox"/> Calling</p> <p><input type="checkbox"/> Texting</p> <p><input type="checkbox"/> Photos</p> <p><input type="checkbox"/> Videos</p> <p><input type="checkbox"/> Internet access</p> <p><input type="checkbox"/> Calculating</p> <p><input type="checkbox"/> Calendar</p> <p><input type="checkbox"/> Clock</p> <p><input type="checkbox"/> Alarm Clock</p> <p><input type="checkbox"/> Planner</p> <p><input type="checkbox"/> Games</p> <p><input type="checkbox"/> Light</p> <p><input type="checkbox"/> Other (please explain)</p>	<p>2. <u>High School</u> Cell Phone Status</p> <p><input type="checkbox"/> I did have a cell phone</p> <p><input type="checkbox"/> I did not have a cell phone</p> <p>3. Current Academic Standing</p> <p><input type="checkbox"/> Freshman</p> <p><input type="checkbox"/> Sophomore</p> <p><input type="checkbox"/> Junior</p> <p><input type="checkbox"/> Senior</p> <p>4. Gender</p> <p><input type="checkbox"/> Male</p> <p><input type="checkbox"/> Female</p> <p>5. Current Age</p> <p><input type="checkbox"/> 20 and under</p> <p><input type="checkbox"/> Over 20</p>
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Please rate each of the statements below by circling the appropriate option based on the following questions:		Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1.	While attending high school , I was aware of my high school's cell phone usage policy.	1	2	3	4	5	6
2.	I felt my high school's cell phone usage policy was fair.	1	2	3	4	5	6
3.	In my high school , I felt I could use my cell phone at any time.	1	2	3	4	5	6
4.	I felt the consequences for using my cell phone during high school hours were fair.	1	2	3	4	5	6
5.	I think cell phones could be used in high school as an educational learning tool.	1	2	3	4	5	6
6.	I think cell phones could be used in high school by students to participate in surveys.	1	2	3	4	5	6
7.	In my opinion, cell phones could be used in high school by teachers to provide feedback to students.	1	2	3	4	5	6
8.	In my opinion, cell phones could be used by students in high school to compete in an educational activity.	1	2	3	4	5	6
9.	In my opinion, cell phones could be used in high school by students to obtain peer tutoring.	1	2	3	4	5	6
10.	I think that cell phones could be used in high school by students to submit assignments to teachers.	1	2	3	4	5	6
11.	In my opinion, cell phones could be used in high school by students to collaborate with other students on class projects.	1	2	3	4	5	6
12.	In my opinion, cell phones could be used in high school by students to seek teacher assistance on assignments.	1	2	3	4	5	6

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