

Students' Technology Use and Its Effects on Peer Relationships, Academic Involvement, and Healthy Lifestyles

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The purpose of this study was to explore students' technology use and its relationship with their psychosocial development. Previous research explored students' computer use in conjunction with their cognitive development. This study examined the effects of computer use and other technologies, such as instant messaging, handheld gaming devices, and MP3 players, and the impact they have on students' peer relationships, academic involvement, and healthy lifestyles. Results show both positive and negative effects on all three constructs of psychosocial development, including differences based on gender and race.

Student engagement on campuses is different than it was a decade ago. According to Arend (2004), engagement is simply defined as "the time and effort spent on activities" (p. 30). Students still concentrate on

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academics, participate in student organizations, and communicate with faculty and friends. However, with the introduction of technology, the ways that students communicate, interact, and engage in activities have changed. With online degrees, smart boards, whiteboards, chat tools, Internet video conferencing, digitized movies, and electronic libraries (Lenhart, Madden, & Hitlin, 2005), college students have more access to and use of technology than any other generation.

Technology has now moved into everyday use with the introduction of things such as Facebook in 2004 (Kim, 2005) and iPods to listen to music and watch videos. Increasingly, students own, rather than just use, a variety of technological devices. A report by Kvavik and Caruso (2005) found that 62% of students own a desktop computer, while 55% own a laptop, 90% own a cellular phone, and 38% own a music device. Although some research has shown the impact computer and electronic mail use has on student learning, little research has been conducted to explore the impact of various types of technology use, including instant messaging, blogs, iPod, and Facebook on student development. In addition, little has been done to explore the differences between students based on gender and ethnicity.

With the increase in technology use by students, higher education institutions are investing money into new technologies for college students in order to meet the needs and expectations of this technology-oriented generation. Duke University gave iPods to all incoming freshmen in 2004 as an experiment in education, student life, and technology (Carlson, 2004). Winona State University gave laptops to their incoming students for 6 years and are now giving them tablet personal computers. University of Maryland in College Park gave away free Blackberrys (Carlson, 2004). The Campus Computing Project (Campus Computing, Retrieved April 3, 2005 from <http://www.campuscomputing.net>) found that 64% of higher education institutions surveyed have strategic plans for wireless networks (WiFi) and that almost 29% of those institutions already have campus-wide WiFi systems running.

Research has shown that students are comfortable with and use electronic mail and the Internet for both academic and social reasons (Arend, 2005; Kuh & Hu, 2001). Kvavik and Caruso (2005) found that students primarily use computers for electronic mail (99.7%).

They also use computers for writing documents for coursework (98.9%), surfing the Internet to support their coursework (98.4%), and surfing the Internet for pleasure (94.8%). In addition, 81% of students use instant messaging, while 75% listen to music and 61% play computer games. On average, students in the 2005 study reported that they spend 11 to 15 hours a week using technology.

Despite the increase in all types of technology, little is known about how these technologies impact student development (Lewis, Coursol, & Khan, 2001). A perception by colleges is that technology will have a positive impact on student learning. Academically, computers allow students to communicate with faculty more often (Arend, 2005), which can improve student-faculty relationships. Students claim to have a better understanding of course material through the use of technology in the classroom (Arend, 2005). Some research studies, however, have conflicting results.

Kuh and Vesper (2001) examined the relationship between students' use of computers and students' cognitive and intellectual development gains reported on the College Student Experiences Questionnaire. These 23 developmental gains include student reported gains such as writing clearly, ability to learn on own, understanding other people, and understanding science as some examples. Students who used computers more often outscored students with low use on every developmental gain. Students also scored significantly higher on learning how to function as a team member. The authors surmise that computers may make it easier for students to communicate with one another and therefore does not hinder students' social skills.

However, a study by Flower, Pascarella, and Pierson (2000) examined the extent of computer and electronic mail use related to students' cognitive and intellectual development. They found that computer and electronic mail use had little impact on composite cognitive development, reading comprehension, mathematics, and critical thinking. Finally, a study by Kuh and Hu (2001) explored computer and information technology (C&IT) use and learning and development outcomes for students. They found no difference in technology use between ethnic groups. Men used C&IT more often than women. First-year students used C&IT less frequently than seniors. Regarding developmental outcomes, students reported that using electronic mail

increased their personal development in regards to their ability to get along with others and understand themselves and increased their intellectual development in regards to their ability to write effectively and synthesize ideas. The use of electronic mail did not increase their general education regarding their ability to understand history and their knowledge about the world. These studies only address computer and electronic mail use and not an extensive use of other technology compared to student development outcomes. More research needs to be done to address students' academic, emotional, and physical well-being related to technology use (Lewis, Coursol, & Khan, 2001).

In spite of some benefits associated with computer and electronic mail use, there are several concerns that need to be considered. Treuer and Belote (1997) discuss the concept of "cocooning" where students may retreat to their computers and isolate themselves from campus activities. Another concern addresses the impact of face-to-face communication versus virtual communication. Although teenagers in Lenhart, Madden, and Hitlin's study (2005) reported they preferred instant messaging to phone or electronic mail, most college students state that electronic mail would not put an end to face-to-face communication (Arend, 2005; Scherer, 1997).

Another concern is access to technology. Not all students have access or skill for technology, and this could impact students' learning. In a review of literature, Tanno (2003) suggested that Latino/a students' academic success is linked to face-to-face interactions with faculty and staff and that an increase in technology will decrease this type of interaction. No empirical evidence addressed how technology impacts students of different ethnicities.

A final point addressed in the literature concerns the addictive behavior of Internet use. Scherer (1997) investigated college students' Internet use and the extent of Internet dependency. Ten clinical symptoms of Internet dependency were developed by the author. Students who reported three or more of these symptoms were categorized as Internet dependent users. Students, in her study, used the Internet to maintain relationships, for academic use, and to meet new people. Males used the Internet more on a weekly basis than females, which supports the research by Kuh and Hu (2001).

Nondependent users focused more on academic use than dependent users (92% vs. 88%). Dependent users played more games, used chat lines more, and utilized the Internet more to experiment socially, to seek sexual material, and to seek illegal material than nondependent users. In addition, the results showed a concern for students' interpersonal development since nondependent users significantly utilize face-to-face communication more than dependent users.

This brief literature review provides a foundation in understanding how technology, specifically computer use, impacts student learning. Little to no empirical research has been conducted to explore the impact various technologies have on student development components. Student development components include psychosocial development as well as cognitive and moral development. Chickering and Reisser (1993) provide a psychosocial development model through which college students progress in developing an identity. One of the key components includes developing interpersonal relationships with peers. Technology provides an opportunity for students to stay constantly connected with one another, but how that technology impacts their peer relationships has not been fully examined.

Another component of the Chickering and Reisser model is establishing identity, which includes having a healthy lifestyle. Good health and wellness practices are important for students to succeed in college and life. Technology could interfere with these practices if students have dependent behaviors. A further aspect to consider is the extent to which technology impacts students' educational involvement. Arend (2005) found that students use the Internet to interact with faculty, find campus resources, and access academic content. However, there is little in the current literature related to how technology impacts students' academic progression through well-defined educational goals.

The purpose of this study was to examine the effect that varying types of technology have on several aspects of psychosocial development. Extent of use was used as a factor in this research, as were race, gender, and other demographic variables.

Method

A two-part *Student Technology Use Survey* was developed by the researchers and distributed to a convenience sample of undergraduate students enrolled in several courses offered by the Department of Counseling and Human Development Services at a large research institution in the Southeast. The first part of the survey asked students to respond regarding the number of hours they used 14 various technologies, including computers, video gaming devices, MP3 players, TVs, DVD players, personal digital assistants (PDA), and cellular phones and the specific purpose (i.e., academic work, entertainment, meet new people, communicate with faculty, communicate with friends, relaxing). The purposes were related to each of the 14 different technologies. The survey was initially reviewed by six student affairs professionals who are well-versed in college student developmental issues, technology types, and uses. In addition, the survey was disseminated to 10 undergraduate students for their review. Changes suggested by these professionals and the students were incorporated into the final version that was distributed in the spring of 2006.

The second part of the survey included three subtasks of the Student Developmental Task and Lifestyle Assessment (SDTLA; Winston, Miller, & Cooper, 1999). The authors defined these as:

- *Peer Relationships*—Having accomplished this subtask, students describe their relationships with peers as shifting toward greater trust, independence, frankness, and individuality; and as feeling less need to conform to the standards of friends or to conceal shortcomings or disagreements.
- *Educational Involvement*—Students who have accomplished this subtask have well-defined educational goals and plans, are knowledgeable about available resources, and are actively involved in the academic life of the college/university.
- *Salubrious Lifestyle*—This scale measures the degree to which a student's lifestyle is consistent with or promotes good health and wellness practices.

These particular constructs were selected for inclusion after reviewing the literature cited above concerning possible developmental impact of technology use on traditional age college students. The SDLTA has been shown in previous studies to be both reliable and valid for measuring these three constructs (Wachs & Cooper, 2002). In addition, reliability tests with these three subtasks have been shown to be .65-.71 for Peer Relationships, .79-.82 for Educational Involvement, and .71-.77 for Salubrious Lifestyle (Winston, Miller, & Cooper, 1999).

The *Student Technology Use Survey* was distributed to 475 undergraduates. A total of 385 valid instruments were then used in the data analysis, resulting in an 81% return rate. Students were not required to complete the survey, but class time was given for students who wanted to stay to complete it. The final sample included 153 men (38.4%) and 226 women (56.8%), with 6 (4.8%) not reporting and so removed from further analysis on this variable. Demographics on gender in this study were representative of the campus population. The respondents included 315 (81.8%) White, 33 (8.6%) African American, 24 (6.2%) Asian, 7 (1.8%) Hispanic, 2 (.5%) Native Hawaiian/Pacific Islander, and 2 (.5%) multiracial students, with 2 (.5%) not responding. To examine differences based on race in this study, White students were considered as one group, while responses from students of color were combined into a second group, since no one subgroup was large enough for further data analysis. Demographics on race in this study were representative of the campus population, although African Americans in the study represented a higher percentage than in the campus demographics.

Results

The primary question in this study was “is there a correlation between level of psychosocial development and amount of technology use?” Results show that there is a statistically significant relationship for a number of the types of technology used by students. Peer Relationship scores are negatively correlated with the amount of time a student uses the Facebook ($r = -.125, p = .014$) and watches DVDs ($r = -.119, p = .019$). The Salubrious Lifestyle Scale scores show a statistically significant negative correlation with use of a Gameboy ($r = -.23, p = .000$), watching TV ($r = -.222, p = .000$), and watching DVDs ($r = -.122, p =$

.016), but a positive correlation with using computers for e-mail ($r = .109$, $p = .032$). A number of statistically significant relationships were found for the Educational Involvement Subtask (see Table 1).

Gender differences in technology use were a demographic variable of interest in this study. *T* tests used to analyze mean differences showed that men tended to use computers for academic work ($t = 2.437$, $df = 377$, $p = .015$) and use Gameboys ($t = 10.407$, $df = 377$, $p = .000$) more often than women in the study. By contrast, women used the Facebook ($t = 4.015$, $df = 377$, $p = .000$), cellular phones for text messages ($t = 2.717$, $df = 377$, $p = .007$), cellular phones for talking ($t = .5895$, $df = 377$, $p = .000$), and blogs ($t = 2.417$, $df = 377$, $p = .016$) more often than men.

Statistically significant differences were also found between White students ($N = 315$) and students of color ($N = 68$). Higher use of technology was reported by students of color for using computers for academic work ($t = 3.366$, $df = 381$, $p = .001$), for Internet surfing ($t = 2.498$, $df = 381$, $p = .013$), and for instant messaging ($t = 2.191$, $df = 381$, $p = .031$); for talking on cellular phones ($t = 2.053$, $df = 381$, $p = .041$); and for watching TV ($t = 2.278$, $df = 381$, $p = .023$).

Discussion

The results of the study support empirically what many professionals have observed anecdotally to be true: there is a connection between the extent and ways in which students use technology and their level of psychosocial development. The area in which the most significant relationships were found, the Educational Involvement subtask on the SDTLA, supports the idea that when students spend large amounts of time engaged in using technology for entertainment, such as playing Gameboy, watching DVDs, or listening to an iPod, they tend to be less involved in their academic life. All of these activities are essentially one-way communication, in which the student is the recipient of the entertainment. Even when the activity is somewhat interactive, as in the use of Gameboys or other gaming devices, it is only interaction of the individual with the game, rather than with other people or with any educational content. It may therefore mimic interaction, but in fact it limits productive contact with peers or academics.

Table 1
Relationships between the SDTLA Subtasks
and the extent of use of certain types of technology

Technology type	Peer Relationships		Salubrious Lifestyle		Educational Involvement	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Computer academic work	.075	.140	.086	.090	.151	.003**
Computer internet	-.073	.154	-.057	.262	-.022	.664
Instant Messaging	-.077	.132	-.063	.216	-.124	.015*
Computer electronic mail use	-.023	.659	.109	.032	.162	.001***
Facebook	-.125	.014*	-.09	.078	-.123	.015*
iPod	-.078	.126	.007	.894	-.127	.013*
Gameboy	-.040	.434	-.230	.000***	-.181	.000***
Cellular text messages	-.049	.334	-.042	.407	.007	.892
Talking on cellular phone	.017	.737	.050	.325	.123	.016*
Cellular picture taking	.054	.291	-.045	.383	-.003	.952
Watching TV	-.040	.428	-.222	.000***	.013	.798
Watching DVDs	-.119	.019*	-.122	.016*	-.153	.003**
Using a PDA	.067	.187	.023	.651	.119	.019*
Writing blogs	.007	.896	.003	.946	-.087	.088

*Statistically significant at .05 level

**Statistically significant at .01 level

***Statistically significant at .001 level

Unlike what Kvavik and Caruso (2005) found, using Facebook and instant messaging were other activities associated in this study with a lower level of educational involvement, reflecting that for some students, engagement in their social relationships overshadows their commitment to educational activities. On the other hand, students who report higher levels of computer use for academics and electronic mail (which may include both academic and nonacademic content), as well as use of a PDA and cellular phone, tend to have higher levels of educational involvement. Therefore, it is not simply the use of technology in general, but rather the purpose for which technology is used, that has consequences for academic engagement. A student may use computers, electronic mail, a PDA, or a cellular phone primarily for social purposes; however, those same technologies can also be used for communication about academic matters, thereby increasing educational involvement.

Similarly, a high level use of technology for entertainment purposes was also associated with a less healthy lifestyle overall. The negative correlation of using a Gameboy, watching TV, and watching DVDs with scores on the Salubrious Lifestyle scale supports the idea that the more sedentary a student is, and the more one-way the interaction is, the less physically active and healthy he or she is.

Research by Lewis, Coursol, and Khan (2001) and Kvavik and Caruso (2005) demonstrated that students use technology for social reasons to connect with peers. While this is certainly a major use of technology, results of the current study show that students' psychosocial development regarding peer relationships is not positively impacted by the use of technology. In fact, the use of Facebook, an online tool designed to connect students with one another (Kim, 2005), has a negative effect on students' peer relationships. While Facebook does provide students with an opportunity to communicate with one another, it may not be as conducive to developing relationships as fully or deeply as direct contact would allow. This may be because students use Facebook as a substitute for direct contact or because the kinds of interaction that dominate Facebook do not promote independence as much as other forms of contact. Treuer and Belote (1997) raised a similar concern about "cocooning," in which students withdraw from social environments; technology may offer ways to avoid direct interaction with peers and therefore impede psychosocial development.

While Lewis, Coursol, and Khans' study (2001) did not find significant differences between genders regarding computer use, the results of the current study show that there are significant differences in other types of technology use. The gender differences identified through this study reflect those found by Kuh and Hu (2001). In the current study, men used computers for academic work and video gaming devices such as Gameboys more often than women did, whereas women tended to use technology for reasons that are more socially-oriented: Facebook, cellular phones for text messages, talking, and blogs.

The final set of significant differences identified, those between White students and students of color, suggest that students of color use technology more for academic work, which contradicts the findings from Kuh and Hu's study (2001). Students of color also accessed the Internet, watched TV, and interacted more with others through instant messaging and cellular phones than White students. Based on this wide range of technology use, perceptions that students of color have limited experience with and therefore less comfort with or less use of technology would be incorrect. The students of color in this study are, in fact, using technology in a variety of ways at a higher rate than their White classmates.

Limitations of the Study

The sample for the study included students who were enrolled at a single institution and who had chosen to enroll in courses that were similar in content. These similarities limit the generalizability to a wider group since a convenience sample was used. Also, the survey asked students to respond to pre-defined categories of technology and purposes of useage. While they did have the option to describe "other" uses, the findings may have been shaped by the questions themselves. Finally, this initial study looked only at three aspects of psychosocial development, as defined by the SDTLA. There are many ways of framing student development that are not captured by the dimensions used for this study, and so conclusions about developmental impacts must be limited to the specific dimensions studied.

Implications for Practice

Working with students in higher education today, the question is not whether, but how and with what eventual outcomes they will use technology. This study, as an initial effort to study the relationship between use of technology and psychosocial development, examined student uses of technology and their developmental levels in the areas of educational involvement, peer relationships, and healthy lifestyles. The findings suggest that while the specific forms of technology being discussed may be new, technology overall is an avenue through which students engage, or choose not to engage, in their studies, with their peers, and in a well-rounded lifestyle. When students use technology for academic purposes, they are more involved in the educational process. When their engagement is primarily for social or entertainment reasons, they tend to be less involved in their academic life. When they use technology primarily for entertainment, they tend to be less healthy. Thus, the decisions that they make and habits that they develop related to using technology can have a direct effect on their academic success, personal relationships, and wellness.

As student affairs professionals work with students, it is important to understand students' use of technology and the purposes for which they use it. As an example, the results of this study suggest the possibility that male students' use of technology for entertainment may have negative effects on their peer relationships, academic engagement, and overall health. Female students' use of technology for social purposes may negatively impact their academic focus. Just as it may be important to understand students' social relationships, personal wellness, and academic issues as context for helping students, knowing how they use technology can provide a more complete understanding of the students' lives.

Despite the original intent of technologies such as Facebook, iPods, and instant messaging, higher education professionals must consider how they could utilize these technologies differently to help students succeed with their academic life, peer relationships, and healthy lifestyles. Duke University encourages faculty to use iPods in their academic courses and provides students with those iPods (Read, 2005). Pick-A-Prof (Carnevale, 2005) allows students to download MP3 files of professor's lectures onto their iPods. Academic information such as

general education requirements or major requirements could be posted on Facebook as a group for students to access or join. As another example, academic advising sessions could take place over instant messaging. Student affairs professionals can be instrumental in helping students explore ways to apply their affinity for technology to productive uses.

This study provides empirical support and deeper insight into what has previously been observed by student affairs professionals. It also gives powerful information with which to educate students, parents, faculty members, and others on campus about the ways that technology can be both supportive of and harmful to student success. It is important that student affairs professionals talk with all constituents, but especially with students, about uses, misuses, and counterproductive uses of technology so that as it continues to increase in variety and prevalence on campuses, there is a framework with which to examine its effects.

Suggestions for Further Research

The exploration of the impact of using technology on the development of college students is just beginning. Further research is needed to determine whether the findings of this study will be supported for students in different institution types, academic programs, and demographic groups. Additional dimensions of student development, such as cognitive or moral development, need to be studied. Finally, technology changes constantly, and applications and uses change even while research is being conducted. Ongoing studies are needed to track trends in usage, adoption of new applications, and effects of technology depending on the age of first exposure. Technology is a new “given” on campus, and student affairs professionals must work not only to understand its effects, but also to help students understand them and to make informed choices about their own lives.

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