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This chapter reviews technology use patterns and the social impacts of technology on well-being among college students. It provides empirical evidence delineating the processes through which Internet use affects well-being among college students, and provides suggestions for ways to advance future studies in this area and for higher education faculty and staff as they work with technologically savvy students.

Students' Technology Use and the Impacts on Well-Being

Shelia R. Cotten

This chapter details the latest information available on the use of technology among college students and what is known about the impacts of this use on their well-being. A variety of studies examine the use of different types of technologies among individuals across the life course; however, fewer studies examine the social impacts of these technologies, particularly in relation to well-being. This chapter reviews the extent of the social impacts of technology in relation to well-being for college students. Before this can occur, however, we need a better understanding of what well-being means.

Social and behavioral scientists typically think about indicators of stress, loneliness, social support, self-esteem, psychological distress, and depression as well-being outcomes. Clinicians focus more often on physical health conditions, diseases, and illnesses. The range of outcomes considered under the concept of well-being could also include such things as alcohol use and abuse, Internet addiction (excessive use of the Internet that may result in a variety of types of problems for individuals), obsessive-compulsive tendencies, and a host of other well-being outcomes. This chapter focuses primarily on the psychosocial and mental health outcomes that are most often examined in the social and behavioral sciences. One can think theoretically about how technology use might bear on some of these well-being outcomes; however, this chapter provides evidence that little empirical research has examined many of these outcomes singularly or in combination with other outcomes.

Importance of Examining Technology Use and Well-Being

Students and young adults use a variety of technologies at very high levels, much higher than other age groups in the United States (Junco and Mastrodicasa, 2007; Lenhart, Madden, and Hitlin, 2005). Unfortunately, however, little is known about the social impacts of the use of these technologies on well-being, although studies are beginning to show that Internet use has a variety of social impacts on individuals: for example, increased resources embedded within one's social networks; the norms of reciprocity and trust that emerge from the expected returns from these resources, commonly referred to as social capital; and increased contact with social networks (Boase, Horrigan, Wellman, and Rainie, 2006; Stern and Messer, 2009). Little research shows the specific pathways through which technology use may have these impacts, particularly in the area of well-being. Although it is useful to understand which groups are most likely to use specific types of technologies, because this knowledge may guide program implementation and interventions designed to assist students, this knowledge does not guide us in specific impacts of technology use on students. If we do not become better at investigating the social impacts of this use, we may fail students in many ways. For instance, we may try to encourage (or discourage) particular types of technology use, yet not understand that such use may have both positive and negative impacts depending on the social context. It may be that technology use does not have direct impacts on well-being, but rather the impacts are mediated through other psychosocial aspects of individuals, such as their self-concepts, sense of mastery or self-efficacy over their lives, and perceptions of their abilities in relation to both technologies and college life more generally.

Technology Examined

Although almost anything can be considered technology in one way or another, this chapter focuses on the use of information and communication technologies (ICTs). *Information and communication technologies* is a broad term that encompasses a variety of communication devices and applications, such as radio, TV, cell phones, computers, computer and network hardware and software, and a variety of applications for these technologies, such as gaming, social networking, instant messaging (IM), and texting. In the past decade, the percentage of young adults using ICTs has increased dramatically. ICTs are now used to fulfill routine tasks such as paying bills and obtaining daily news information; technology diffusion into all aspects of life is ongoing, and despite some barriers (such as access, cost, and skill), the acceptance rates of technology among the population can be high (Lenhart, Madden, and Hitlin, 2005; Czaja and Barr, 1989; Dozet, Lyttkens, and Nystedt, 2002; Enders, 1995). "The Internet exploded during the late 1990s into a powerful new social institution" (Goldsmith,

2000, p. 148). It is now a heavily relied on source of reference material for the public, transcending existing geographical and regulatory boundaries and blurring distinctions between professions and expertise (Cotten, 2001; Hardey, 1999).

The use of computers, the Internet, and cell phones are the ICTs discussed in this chapter because they have become mainstreamed into society. Large percentages of individuals, particularly young adults, use these technologies, and public access to and availability of computers and the Internet exists in most communities (Lenhart, Madden, and Hitlin, 2005; Boase, Horrigan, Wellman, and Rainie, 2006). In the United States, 68 percent of Americans own a desktop computer, 30 percent have a laptop computer, and 73 percent live in a household with an Internet connection (Fox, 2005; Horrigan, 2007). According to recent Pew Internet Studies reports, 73 percent of U.S. adults are Internet users, and on average, about 70 million U.S. adults use the Internet on a given day (Pew Research Center, 2006; Madden and Rainie, 2003). The highest rates of Internet use are among those eighteen to twenty-nine years old (88 percent), with declines in rates as age increases (Pew Research Center, 2006). Other research shows that communication is the main use of the Internet (Fox, 2004; Cotten and Bowman, 2005; Hoffman, Novak, and Venkatesh, 2004; Kraut and others, 1998).

Cell phone use is increasing in the United States, with data suggesting that over 60 percent of Americans own a cell phone (Totten, Lipscomb, Cook, and Lesch, 2005). As of 2005, cell phones represented about 43 percent of all U.S. phones in service (Totten, Lipscomb, Cook, and Lesch, 2005). The number of individuals living in households that use only mobile phones (rather than landline phones or a combination of both) has been increasing steadily since 2003 (Blumberg and Luke, 2007). Much of this increase in mobile phone use has been among young adults (Totten, Lipscomb, Cook, and Lesch, 2005), with approximately 20 to 25 percent of adults aged eighteen to twenty-four and 30 percent of those aged twenty-five to twenty-nine living in households with only mobile phones (Blumberg and Luke, 2007; Tucker, Brick, and Meekins, 2007).

What We Know About Students' Technology Use

Although research on the types, percentages, and predictors of students' and young adults' technology use has increased in recent years, many of these studies tend to be small scale in nature and rarely use random samples of students or young adults. In addition, many of the larger studies are primarily exploratory or descriptive rather than explanatory in design. Internet use, followed by cell phone use, among college students is presented in this section. It primarily reports the results of studies conducted within the past seven years as levels, functions, and types of technology use have evolved rather dramatically.

Internet Use. Early studies of Internet use often failed to distinguish between types and functions of use. For example, studies examined whether individuals used or did not use the Internet, and if they did use the Internet, overall levels of use were often reported rather than specific types and levels of use (see studies by Anderson, 2001; Kubey, Lavin, and Barrows, 2001; Matthews and Schrum, 2003). These typologies ignore significant differences in the types, functions, and impacts of activities that individuals conduct online either singly or with others. A wide range of activities can be conducted online, among them Web surfing, e-mail, live chatting, IM, listservs, wikis, blogging, and gaming, and these activities can be social or solitary in nature. "Because modes of online communication differ, researchers need to make distinctions between their various uses," notes Quan-Haase (2007, p. 674).

Recent studies have expanded what is known about college students' computer and Internet ownership and use patterns. Studies at individual universities suggest that students have been using computers for a variety of purposes (for example, e-mail, surfing, and IM), on average, for over seven years (Quan-Haase, 2007), almost all students report owning computers (Hargittai, 2007; Malaney, 2004–2005), and the majority of students at universities have been online for more than six years (Quan-Haase, 2007; Hargittai, 2007). Malaney (2004–2005) found that Internet use had increased significantly among students in recent years at the University of Massachusetts, Amherst, with almost 98 percent of students owning their own computers in 2003 and 95 percent having had Internet access at home during their high school years.

Quan-Haase (2007) found that 65 percent of the 268 students in her study spent more than three hours per day online, 62 percent used e-mail weekly, 67 percent used IM daily, and most students had been using IM for four years or more. Morgan and Cotten (2003), in a sample of 287 college first-year students, found that students spent an average of 3.9 hours using e-mail, 16.3 hours of chatroom and IM use, and almost 12 hours using the Internet for noncommunication-related activities per week, such as surfing or playing games. Hargittai (2007) found that 82 percent of students reported using chat features of digital media, and almost 84 percent went online more than once a day. Gordon, Juang, and Syed (2007) report that the top five uses of the Internet in their convenience sample of undergraduate psychology students were e-mailing friends, getting help with school work, talking with friends, e-mailing family, and IM.

In larger-scale studies encompassing multiple college campuses, two studies merit special attention. Salaway, Caruso, and Nelson (2007), in their large-scale survey (103 institutions and 27,846 respondents) of students, found that college students reported spending an average of eighteen hours per week using the Internet in various capacities. In addition, almost 7 percent of their respondents reported spending more than forty hours per week online. Over 98 percent of students reported owning a computer, with 60

percent owning a desktop computer. Almost 100 percent of students reported using e-mail, and 84 percent reported using IM. They also found that social networking use rates were very high among college students, with over 80 percent using them and most reporting that they do so daily. Although blogging was not as popular as IM and e-mail, approximately 28 percent of their respondents reported using it. (Although Salaway, Caruso, and Nelson's study is one of the largest in terms of number of respondents, they reported only a 10.8 percent overall response rate, which is very low even for student surveys. In addition, females appear to be overrepresented in respondents.)

Junco and Mastrodicasa (2007), in their survey of all students enrolled at seven schools, had responses from 7,705 students, over 97 percent of whom owned computers. IM use was very popular in this study: 75.5 percent of the students used it; 35 hours per week on IM was the median, and 18.5 percent used IM on wireless devices. Almost 28 percent of respondents reported having blogs, and an even larger percentage reported reading blogs (44.4 percent). Over two-thirds of students had Facebook accounts; these students reported logging on to Facebook about twice every day. (Similar to the study by Salaway, Caruso, and Nelson, 2007, Junco and Mastrodicasa reported a low response rate to their survey: only 8.7 percent overall.)

These results suggest that almost all college students either own or have access to computers and the Internet. In addition, they use a variety of Internet applications in their daily lives, especially those related to communication, particularly IM and e-mail.

Cell Phone Ownership and Use. Less is known about cell phone use and applications among college students than Internet use. As with the studies examining the Internet, similar limitations exist with many of these studies, such as small samples, nonrandom sampling designs, and low response rates. It does, however, appear that the diffusion of cell phones into the lives of youth has been rather dramatic. In particular, college students own cell phones at high rates and are high users of this technology (Hargittai, 2007; Junco and Mastrodicasa, 2007).

Mobile phone ownership rates generally exceed 70 percent, regardless of the size and type of study examined. For instance, Quan-Haase (2007), in a study of Canadian students at one university, found that 78 percent of the students reported owning a cell phone, but only 36 percent used it daily. Hargittai (2007), in a study of all incoming students at the University of Illinois-Chicago, found that almost 97 percent had a cell phone. Junco and Mastrodicasa (2007) found in their multicollege study that 94 percent of respondents reported owning cell phones. Salaway, Caruso, and Nelson (2007) report that among college students in their study, 86 percent own cell phones (without Internet access) while 12 percent own smartphones (which often include personal digital assistants, Internet, gaming, and cell functions in one device). Unfortunately, neither of the two large-scale studies (Salaway, Caruso, and Nelson, 2007; Junco and Mastrodicasa, 2007) reported detailed use information for cell phones.

In a small-scale study of college students at one university in the South, Auter (2007) found that students reported around ten and a half hours of cell phone use per week, with the majority of use related to interpersonal communication with social network members. A study with 383 respondents conducted by Totten, Lipscomb, Cook, and Lesch (2005) at four colleges in the United States also found that cell phone use was related to wanting to keep in touch with social network members, to be continually available for social stimulation and for emergency purposes, and to use the phone book functions of the cell phone, among other reasons. Students in studies by Quan-Haase (2007) and Totten Lipscomb, Cook, and Lesch (2005) appear to use text messaging less than students at other colleges, with over 50 percent of students in Totten, Lipscomb, Cook, and Lesch's study and 43 percent in Quan-Haase's study reporting that they either did not use text messaging or used it very infrequently. Mastrodicasa and Kepic (2005) found that over 57 percent of cell phone users in their University of Florida college student sample used text messaging at least once per day.

As this review has illustrated, there are fewer studies examining college students' types and levels of cell phone use, particularly in the United States. The studies suggest that cell phone penetration rates are very high among college students in the United States and Canada and that students use a variety of functions of the phones: talking, texting, e-mailing, and picture taking. The majority of these studies are descriptive in nature and reveal little about how larger patterns of stratification are related to phone use. Almost no studies to date examine the social impacts of mobile phone use, especially among youth. Clearly more theory is needed to guide researchers in examining the social impacts of mobile phone use.

Social Impacts of Technology Use on Well-Being for Young Adults

According to Katz and Sugiyama (2006), researchers who have studied the social impacts of ICTs have traditionally examined how ICTs can solve individuals' problems and needs. A variety of studies have examined the impacts of ICT use on social interaction (see Shklovski, Kiesler, and Kraut, 2006, for a meta-analysis of studies examining the Internet and social interaction), most with nonstudent samples.

Katz (1997), in one of the earliest studies examining the social impacts of mobile phones, identified several impacts: uncertainty reduction, security, efficiency, information access, contactability, social interaction, and social control. His study was not focused on youth or on the health impacts of mobile phone use. More recent studies examining the social impacts of cell phone use have primarily examined impacts on sociability and contact with social networks (Igarashi, Takai, and Yoshida, 2005; Kim, Kim, Park, and Rice, 2007). Concerns related to the health effects of radio-frequency radiation from using mobile phones have been expressed by the public and

some researchers (Huss and others, 2007). In a systematic review of existing studies on this topic, Huss and others (2007) conclude that although a majority of studies examining this topic have found some biological effects, it is not clear whether these effects result in health hazards. A recent study of youth in Finland found that access to mobile phones as well as frequency and intensity of use were related to health-compromising behaviors such as smoking and alcohol use (Leena, Tomi, and Arja, 2005). However, the researchers suggest that mobile phone use "may also be health protecting in facilitating the maintenance of social relations and diminishing insecurity of the physical environment" (Leena, Tomi, and Arja, 2005, p. 45). Unfortunately no research is available on the social impacts of mobile phone use on more psychosocial aspects of well-being, such as self-esteem, mastery, psychological distress and depression, and social support.

Although there have been almost no studies assessing the social impacts of mobile phones on well-being, some studies have examined the social impacts of Internet use on well-being. Some researchers have noted that Internet use has negative impacts on well-being; however, Valkenburg and Peter (2007) show that this negative relationship disappears when controlling for closeness to friends and online interaction with strangers. They showed that the most adverse effects of Internet use on well-being occur for individuals who report being lonely. Other researchers have shown that excessive use of the Internet may result in Internet addiction (Nalwa and Anand, 2003; Greenfield, 2000; Morahan-Martin and Schumacher, 2000). LaRose, Lin, and Eastin (2003) note that what others have called Internet addiction can actually be redefined as deficient self-regulation; they say that individuals with deficient self-regulation (a failure to regulate their Internet use) use ICTs to relieve boredom, decrease loneliness, whittle away time, and enhance their social identity. Thus, this suggests that the causal ordering between technology use and addiction is not as clear-cut as some would suggest. More research is needed concerning whether specific social stressors or personality types may lead youth to become addicted to the Internet and its applications, or vice versa.

A small-scale experimental design study found that Internet use was associated with decreased loneliness and depression and increased self-esteem and social support (Shaw and Gant, 2002). However, a small-scale study at one university revealed that high levels of Internet use were associated with high levels of emotional loneliness (missing intimate relationships) but not social loneliness (missing a wider social network; Moody, 2001). This suggests that particular aspects of loneliness may differ in relation to Internet use, an area that is generally neglected in the literature. These small-scale studies, however, examine Internet use in general, not specific types and levels of usage.

In a study that examined the impact of types of Internet use on self-esteem levels among college students at one university, Rohall, Cotten, and Morgan (2002) found that time spent on the Internet for surfing or other noncommunicative purposes was negatively associated with self-esteem. In addition, IM and chatroom use had a small but positive effect on self-esteem

and a strong effect on social support. Furthermore, Morgan and Cotten (2003) found that increased communication through e-mailing, chatting in chatrooms, and IM was associated with decreased depression among college students. However, higher levels of Internet use for gaming, shopping, or research were associated with higher levels of depressive symptoms. They also found that using e-mail had a larger impact on males' depression than it did for females' (for example, higher levels of use were associated with larger decreases in depressive symptoms for males than for females). They suggest that encouraging men to use e-mail communication more effectively may enhance their social support and ultimately their mental health. Gordon, Juang, and Syed (2007), in a sample of undergraduate psychology students at one university who were Internet users, found that using the Internet for coping with stress was associated with higher levels of depressive symptoms and social anxiety and lower levels of family cohesion. However, they found that using the Internet for communication or to find information was associated with more family cohesion. These results suggest that the specific types of and motives for Internet use need to be examined in studies, because general use may not reveal the intricacies that more specific measures of use and motives might illuminate.

Limitations of Prior Studies

A key limitation of research on the social impacts of ICTs on well-being is the lack of published studies in this area, particularly in relation to cell phone use. Although more studies have been conducted in relation to the Internet and well-being, many focus on specific subgroups of the population, and many are small scale in nature and examine students at only one or a few universities (examples of this include Moody, 2001; Shaw and Gant, 2002; and Morgan and Cotten, 2003). If researchers do attempt to include a larger number of universities in their studies, this work typically is not focused on the social impacts. In addition, sampling designs are often not random, thus limiting the generalizability of the findings. Many studies are also plagued by low response rates, further limiting the generalizability of findings; see for example Salaway, Caruso, and Nelson, 2007. Of the studies that do examine well-being, almost none are longitudinal in design; thus, we cannot determine causal ordering. For example, is it ICT use that is affecting well-being or that students with particular health issues tend to use ICTs in particular ways?

Evidence from the Field

To elaborate on the processes through which Internet use affects well-being, the results of the College Internet Use Study (CIUS), which examines the impact of residential first-year college students' use of the Internet on their contact with social ties and well-being, is reviewed. Data for the CIUS are

from a random sample of residential college first-year students at a midsized mid-Atlantic public research university. The response rate for the Web-based survey used in this study was 58 percent, with 227 respondents.

Students in the CIUS reported an average weekly use of six hours using e-mail, twenty-one hours IM, less than one hour a week chatting in chatrooms, a little over an hour a week posting messages on bulletin boards, eight hours a week surfing the Internet, and five hours gaming. Students had high levels of self-esteem (mean score of 32 out of 40), moderate levels of depressive symptoms (mean score of 14 out of 25), and high levels of mattering (mean score of 16 out of 20). The mean score for the Internet's effect on contact with students' social networks was 2 (out of a maximum score of 4).

A path analysis model (a form of regression that examines the interrelationships among independent, intermediary, and dependent variables) is used to examine the interrelationships between hours of Internet use, change in contact with social networks as a result of using the Internet (whether contact has increased, decreased, or there has been no change), mattering (a perception that the individual matters to others), self-esteem (positive and negative evaluation of the self), and depression (assessed as depressive symptoms). (All path models controlled for gender, age, race, and whether the respondent had declared a major.) Three types of Internet use were found to be significantly related to change in network contact. Students with higher levels of IM were more likely to report that using the Internet led to an increase in contact with members of their geographically near social network ties, in addition to their strong and weak social network ties. Higher levels of surfing were also related to increased contact with strong social network ties. However, higher levels of gaming were associated with a decrease in contact with strong network ties using the Internet.

Instant messaging and gaming were the only Internet use measures that were statistically related to mattering ($p < .05$). An hour using IM was associated with a 16 percent increase in mattering and an hour increase in gaming with a 16 percent decrease in mattering.

Three changes in social network contact measures were significantly associated with mattering, one change in contact measure was related to self-esteem, and none were related to depression. Increases in contact with geographically distant social ties, strong network ties, and weak network ties as a result of Internet use were all positively associated with mattering. As contact with these social networks increased with use of the Internet, students' sense of mattering also increased. As students' contact with those in their social networks who live in geographically distant locales increased using the Internet, their self-esteem also increased. The higher levels of mattering were associated with higher levels of self-esteem and lower levels of depression. (The relationship between Internet use and self-esteem and depression was also examined. None of the Internet use measures were significantly associated with these outcomes.)

Figure 4.1. Interrelationships Among Internet Use, Social Network Contact, and Well-Being Outcomes
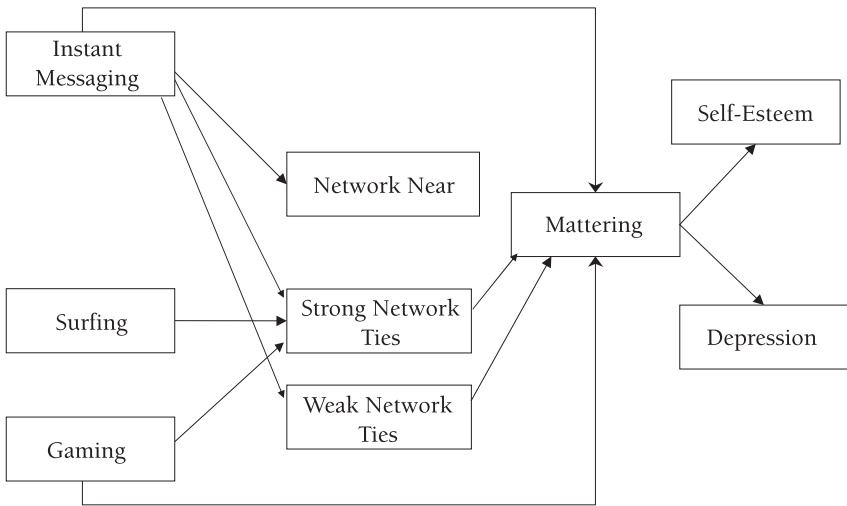
Similar to previous research by Hampton and Wellman (2001), use of the Internet was a predictor of contact with family and friends. The results of the CIUS study expand the understanding of the types of Internet use and how they result in changes in contact with specific types of social networks as a result of using the Internet. Instant messaging was the specific type of communicative Internet use related to increased contact using the Internet with geographically near, strong, and weak network ties. This may allow them the ability to communicate more frequently in real time with their social networks without the cost of long-distance phone bills. Because cell phone use was not ascertained, we do not know if text messaging might have similar effects on social network contact. E-mail may not have been related to contact among this sample of college students, as some studies suggest that students prefer to use IM, social networking sites, and text messaging to communicate with their social networks (Carnevale, 2006; Lenhart, Madden, Macgill, and Smith., 2007; Salaway, Caruso, and Nelson, 2007).

Higher levels of Internet surfing were associated with increased contact and higher levels of gaming with decreased contact with strong social network ties. Given Junco and Mastrodicasa's research (2007) showing that multitasking is common among college students, it may be easier to surf the Internet while also using communicative functions of the Internet (multitasking).

Three of the four measures of change in network contact as a result of Internet use were associated with level of mattering to others. As students' contact through the Internet with their geographically distant, strong, and

weak social network ties increased, their sense of mattering increased. Change in contact with geographically close social networks as a result of Internet use was not related to mattering. This may perhaps be because individuals are more likely to see others who live in geographical proximity to them, and thus their level of contact may not change as a result of the Internet. As IM use increased and gaming decreased, mattering increased. These findings provide further insight into the direct and indirect processes through which Internet use has impacts on aspects of well-being. Third, as students' mattering increased, their self-esteem levels increased and depression levels decreased, which is similar to earlier research on mattering (Rosenberg and McCullough, 1981; Taylor and Turner, 2001).

The results of the CIUS expand the theoretical and empirical knowledge base in the area of the social impacts of Internet use. Study findings provide evidence for the importance of specific types and pathways through which Internet use may ultimately affect aspects of self-concept and well-being, thus supporting suggestions made by Morgan and Cotten (2003) about the importance of differentiating among types of Internet use. The CIUS findings suggest that particular types of communicative Internet use, such as instant messaging, have a beneficial effect on contact with particular types of social network members, which then have a beneficial effect on mattering, and mattering is associated with self-esteem and depression. While previous research has examined Internet use effects on well-being, it has not examined the interrelationships among Internet use, changes in contact with various types of social networks, and mattering on self-esteem and depression. This study examined specific types of use, and thus we had the ability to better isolate the importance of specific types of use and the pathways through which they have an impact on well-being.

Key Unanswered Questions and Advice for Those Working with College Students

Several questions remain unanswered in the literature on the social impacts of ICT use among students and young adults. For example, we know little about the use of multiple technology devices, multitasking with these and other devices, and the impacts of use on well-being.

Given that IM, social networking, texting, and cell phone use are key aspects through which youth communicate with others today, it behooves us to better understand the social impacts of this use. Some researchers suggest that college students are less interested in using e-mail and more interested in real-time data communication such as IM and texting (Salaway, Caruso, and Nelson, 2007). This suggests that future research needs to continue to expand the range and functionality of different types of technologies being assessed. It is not enough to simply assume that youth merely use their cell phones to talk to others; with the advancing capabilities and diffusion of cell phones, assessing the functions and processes through which

youth use them to connect with others and the social impacts of these functions will be critical to elucidating the key ways that use of these technologies has impacts on youth.

In addition to expanding the assessment of the range, type, and functions of technologies being used by college students, we also need to assess a range of social impacts of these technologies. Most studies focus on contact with social networks, social support, loneliness, and depression as outcomes. The results of the study presented in this chapter suggest that mattering and self-esteem are also important outcomes that may be directly and indirectly associated with technology use. I also suggest that the social impacts on students' sense of stress and self-efficacy be examined. Each of these outcomes has important manifestations for students' well-being. Perhaps we should also think about how to use ICTs to enhance health promotion and health education and for health information dissemination.

Almost no studies follow youth over time to examine trajectories of use and well-being. This is certainly partially a result of funding mechanisms and the desire of funding agencies to fund research aimed at identifying inherent biological or physiological mechanisms as the causes of health problems. Funding agencies need to better recognize the importance of social factors and processes in health and well-being outcomes, particularly in relation to technology use and its impacts.

Researchers need to embark on more extensive research projects related to technology use and the social impacts among college students and young adults. As noted earlier in this chapter, many researchers rely on one university sample and nonrandom methods of sample generation and examine only one type of technology use. Researchers who are interested in these topics need to work together to conduct large-scale, multiple-campus technology assessments. Administrators and higher education staff members need to be cognizant of the importance of these projects and be willing to help researchers access representative random samples of college students. Otherwise we continue to conduct small-scale, university-specific, nongeneralizable studies that may contribute to our knowledge level in limited ways but do not advance the larger wisdom level in this area of research. We also have to think much more critically about what acceptable response rates for our surveys are and how we can increase response rates. The two largest studies reported in this chapter had less than 15 percent response rates. What does it mean when 85 percent or more of the students being surveyed choose not to respond to surveys? We have to think more critically as researchers about how to conduct surveys to ensure that we obtain good data upon which to assess use and impacts.

College students today do not interact primarily with one type of technology. Information and communication technologies have become ubiquitous among youth. Focusing on specific types of technologies fails to account for the multiple and complex ways in which youth interact with technologies and also fails to fully examine the myriad ways through which technologies may affect the well-being of youth.

The results of the empirical study and prior literature detailed in this chapter may provide helpful information to college administrators. Administrators may want to develop campaigns that inform parents of the benefits of using specific applications of the Internet and mobile phones to stay in touch with students and the benefits using this technology will have in their transition to college and well-being outcomes, such as decreasing uncertainty, improving communication, and fostering social interaction. The results of Morgan and Cotten (2003) suggest that we should encourage usage of e-mail by males; this may be an important intervention strategy to enhance their well-being. We do not yet know if text messaging may also provide positive impacts on well-being. However, Harley, Winn, Pemberton, and Wilcox (2007) suggest that given students' high levels of use of text messaging, we should consider using this medium as a way to help students in their transitions to college life. Student affairs professionals should implement e-mail or text messaging programs aimed at increasing communication among male college students.

Given that companies are developing computer-mediated or mobile-mediated communication networks that can be used in a variety of ways, college student affairs professionals should consider how they can best use these networks effectively to contribute to student well-being; for example, implementing networks designed for certain groups (for example, all incoming first-year students, students and their faculty mentors, university residential life staff members and students, and students who live in certain types of residences) may increase perceptions of support, adjustment to college, and well-being more generally. Similarly, implementing programs to detect and decrease Internet gaming and shopping may be beneficial for decreasing depressive symptoms among college freshmen.

Although this chapter has attempted to provide a summary of some of the most pertinent literature in the area of ICT use among youth and well-being, this summary is limited by space and time constraints. I encourage other researchers, staff, and administrators who study and work with college students to continue to pursue the latest knowledge in this field. Given the constant changes and evolving nature of ICT use in U.S. society, researchers should strive to continually examine ICT use and the social impacts of this use on individuals across the life course.

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SHELIA R. COTTEN is an associate professor in the Department of Sociology at the University of Alabama, Birmingham.