Combating Low Digital Literacy in the College Classroom: A Narrative Review

Ryan Hiller
Florida Southern College

Abstract

Rapid changes in information communication technologies (ICTs) require college students develop, possess, and adapt digital literacy skills needed for student success. Many students in college did not develop these basic skills in their K–12 education needed for higher level academic success. A narrative review of the literature explored why some students are coming to college with digital literacy skills below minimum expectations and how education leaders can provide equitable access to technology to combat low digital literacy skills. The review identified three levels of digital divides—access, skillset, and outcome—that impact student success. Institutional interventions to combat these divides are explored. Students who have the opportunity to develop their digital literacy skills early in their post-secondary schooling will find greater academic and later professional success.

Keywords: digital literacy, digital divide, student success, literature review

Introduction

The development, emergence, and rapid change of new information and communication technologies (ICTs) in the past 20–30 years have fundamentally changed the way people live and work. Individuals must develop, possess, and adapt the skills needed to navigate the global landscape. Those who do not have access to technology and lack technical abilities risk falling behind personally, academically, and professionally (Duart, 2010; Nataraj, 2014; Peña-López, 2010). In its original use, the term *digital divide* referred to those who did not have access to the Internet (Kinghorn, 2014); however, this phrase has expanded to include issues of access to technological materials, such as a laptop or smartphone, and the skillset required to use such technologies (Kinghorn, 2014; Reisdorf et al., 2020). Colleges and universities are well-positioned to prepare students to meet the challenges of global competitiveness by developing students' digital literacy skills (Ekta Jain, 2011; Shopova, 2014).

A major misconception regarding college students is that technology access issues only pertain to device ownership (Campos-Castillo, 2014; Kinghorn, 2004; Shopova, 2014); however, the issues are much more complex. Devices require an Internet connection, including Wi-Fi, and maintenance, a challenge that students from low socioeconomic backgrounds encounter, contributing to lower academic achievement than their peers from affluent households (Buzzetto-Hollywood et al., 2018; Reisdorf et al., 2020). These digital divides explain disparities in college students' digital literacy. Shopova (2014) defines digital literacy as the ability to evaluate and interpret information through basic thinking skills and core competencies by which one could not orientate and perform tasks in an interactive environment. Many students enter college without basic technical skills needed for

---

Ryan Hiller is currently the Director of Student Outreach and Support in the Office of Student Affairs at Eckerd College in St. Petersburg. He attended Aurora University in Aurora, Illinois where he earned a Bachelor of Communication and a Master of Business Administration. Ryan has completed all coursework for his Doctor of Education degree with Florida Southern College. His dissertation focus is on minoritized students and student success.

academic success, an issue particularly salient for non-traditional students or those whose K–12 education did not prepare them for the technological expectations of college (Buzzetto-Hollywood et al., 2018; Jesnek, 2012). Educators and administrators may falsely assume that students have developed the required digital literacy skills needed before their college enrollment and support eliminating basic computer courses that contribute to overall student success, furthering, rather than remedying, extant disparities (Buzzetto-Hollywood et al., 2018; Nataraj, 2014; Peña-López, 2010; Reisdorf et al., 2020).

A lack of access to technology and educators' assumptions that students obtain a strong digital skillset in K–12 education are two reasons offered for why students come to college and university campuses with low digital literacy skills (Nataraj, 2014; Shopova, 2014). To effectively remedy this phenomenon through manageable interventions, it is important for college staff and faculty to first acknowledge and understand that this is an issue facing today's college student (Nataraj, 2014). It is only then that the digital divide and building of essential technological skills can be improved at the collegiate level. The purpose of this brief narrative review is to explore reasons why college students come to campus with varying levels of technological competencies essential for college coursework and what might be the responsibility of institutions to develop digital literacy skills to ensure student success. The questions guiding this review were:

Q1: Why are students coming to college with digital literacy skills that do not meet the expectations of the classroom?

Q2: What can higher education educators do to ensure each student has equitable access to technology requirements essential for student success?

To answer the research questions, the search phrases used were "digital divide," "higher education," and "student success." Digital divide was selected as the primary search phrase as I had previously heard the term used to describe differences in students' ability to use technology. Higher education was selected as this focused on the specific population of students to study without incorporating elementary and secondary education students. Student success was selected because the goal of the research question is to determine what technological factors institutions can support to ensure their students have equal access in the college classroom to promote their achievement.

The research was collected through a search using the EBSCO and ERIC databases. The EBSCO search began with a search of the phrases "digital divide," "higher education," and "student success" from the years 2010–2020 which resulted in one article. These years were selected to provide the most recent research in regards to the use of ICTs in higher education and how it has led to digital divides. One article was found that met this search. The phrase "student success" was eliminated yielding a result of 122 articles. The article titles and abstracts were reviewed to look for relevance to the research questions, eliminating topics that were too narrowly defined. Many of the discarded articles focused on specific populations of interest, such as online-only education, or were limited to specific geographic areas. The goal was to find articles that encompassed many student experiences to answer the research questions without focusing on a specific country or online-only students. Eleven articles were selected and fully read with nine being used in the final draft. The review of the EBSCO articles led to the bibliographic search and selection of the articles "The Need for an Introductory Computer Course" (Nataraj, 2014) and "Digital Inequality: Differences in Young Adults' Use of the Internet" (Hargittai & Hinnant, 2008) as these were referenced by many researchers. Research in the ERIC database started with the same search phrases: "digital divide," "higher education," and "student success," increasing the active years to 2000–2020 as the EBSCO search years were too narrow. This generated three articles. The phrase "student success" was eliminated increasing the total articles found to 193. Of the 193 articles generated, only 93 articles were peer-reviewed, and of that 93, only 20 articles had full PDFs available. The abstracts for the 20 articles were read with four

articles being selected for inclusion in the final draft as the content specifically addressed the research questions.

Findings

The findings in the literature show that digital divides go much deeper than Internet access. Across the studies reviewed, three levels of digital divides were identified as impacting student success: first level divides looked specifically at access to physical devices and Internet connection (Campos-Castillo, 2014; Duart, 2010), second level divides focused on digital literacy skills (Reisdorf et al., 2020), and third level divides looked at outcomes of Internet use (Hargittai & Hinnant, 2008; Liebenberg et al., 2012; Reisdorf et al., 2020). Each level of the digital divide can affect the next level, suggesting opportunities for intervention by institutions to foster positive development and growth of skills in students (Reisdorf et al., 2020).

Level One: Socioeconomic Status Impacts Technology Access

Socioeconomic effects on a student align with the first level digital divide. As of 2016, two-thirds of adults living in households making $30,000 or less annually reported that their smartphone was the only device they owned that could access the Internet at home, whereas those who live in high-income households are found to own multiple devices in their homes such as computers, smartphones, and tablets (Buzzetto-Hollywood et al., 2018). The inability to have or access technology further increases first level digital divides between impacted students and their peers (Kinghorn, 2014; Reisdorf et al., 2020). Students who do not have formal and informal technology usage are at a disadvantage academically when they get to the college campus. Students from lower-income households, which often include students of color, may experience lower grade point averages (Reisdorf et al., 2020). Their knowledge of how to access the Internet for research and to complete assignments is a direct impact of the first level divide. Students who face financial inequalities have limited access and ICT knowledge become reliant for information from those who have it, leading to a complex struggle that can keep them in their current socioeconomic position (Selwyn, 2010; “The Persisting Racial Digital Divide in Internet Access,” 2010).

Many colleges do attempt to assist students most in need of device and Internet support. These institutions, for example, offer their students free Wi-Fi connection, and some provide free laptops, but this does not help disadvantaged students once they leave campus (Reisdorf et al., 2020). Simply providing access does not address low digital literacy and associated negative academic consequences, such as lower GPAs (Peña-López, 2010; Reisdorf et al., 2020). Students who cannot afford a computer or Internet access at home have less time to manage their homework, conduct research, and complete class assignments (Campos-Castillo, 2014; Reisdorf et al., 2020). Students are bound to computer availability and the hours set by public libraries to finish their work giving additional barriers to overcome (Reisdorf et al., 2020).

Banerjee (2020) explored levels of technological access and technologically related skills for students in underserved and underrepresented populations including first-generation students, students from low socioeconomic backgrounds, and students of color. The study aimed to look for correlations between technology-related access and academic success through a cross-sectional research study. The study found that the students in the sample from low-income, first-generation, and non-White students had significantly lesser amounts of technological devices, with many using their smartphones to conduct research. The implications of the study showed that institutions of higher education need to devise appropriate interventions to bridge digital and learning divides between student populations.

Access and use of technology are defined by more than financial factors; they can also be influenced by global economics, politics, cultural factors, and technological ineptitude (Jesnek, 2012; Liebenberg et al., 2012). While these factors are important, socioeconomic status remains the strongest predictor

of student technology use and skill (Hargittai & Hinnant, 2008). Students who grow up in affluent homes use the Internet earlier and therefore typically develop technological skillsets prior to coming to college that promotes their success (Kinghorn, 2014). Unequal access to ICTs leads to improper usage, placing students from low-income backgrounds at first and second level digital divides.

Level Two: Opportunities to Develop Digital Skills

Second level digital divides explore the skill set needed to engage with ICTs. Individuals need to have digital competence as a foundation for lifelong learning and to participate in society and the economy (Duart, 2010; Nataraj, 2014; Peña-López, 2010). For students to be successful in their courses, and later in their careers, they must have an understanding of technology to use it in various forms (Ekta Jain, 2011; Kinghorn, 2014; Nataraj, 2014; Shopova, 2014). This begins with the infrastructures, technology hardware and software, and the skills to use the infrastructure (Peña-López, 2010). Digital skills are the ability to access and search digital libraries, navigate databases, the creation of e-publications, online videos, and integration of audio recordings into their digital presentations (Peña-López, 2010; Shopova, 2014). These learning goals contribute to the societal need that professionals develop these effective skills and abilities to not only navigate and use these tools but that they serve as a foundation to grow these skills during their lifetime (Shopova, 2014).

The education community responded quickly to social shifts early this century to include ICTs in course curriculum, but their inclusion is not universally adapted across disciplines (Buzzetto-Hollywood et al., 2018; Peña-López, 2010). Higher education student learning goals include the use of technology to analyze ideas and communicate information, efficient use of presentation software to prepare slideshows and create web-based files, effectively use e-mail, and create and edit documents using general software (Buzzetto-Hollywood et al., 2018). No one course or department is designated as being responsible for developing these critical skills (Buzzetto-Hollywood et al., 2018; Jesnek, 2012). Many students report that they feel comfortable using e-mail, basic Microsoft Word functions, can use basic slideshow software, and some digital library resources, but their engagement and knowledge decline when applied to more sophisticated software (Buzzetto-Hollywood et al., 2018; Peña-López, 2010; Selwyn, 2010). This divide is wider when comparing students in business or engineering programs whose faculty integrate these functions into their curriculum more than faculty in the humanities (Buzzetto-Hollywood et al., 2018; Peña-López, 2010).

Student engagement with ICTs is complicated as usage varies between the generations. Students classified as older (25+) encounter technological deficiencies in their computer usage when compared to traditionally aged students (18–24) through lack of experience and skills often due to a 10–20-year absence from the classroom (Duart, 2010; Jesnek, 2012). Colleges develop digital literacy skills across disciplines by integrating various formats into the classroom.

The use of ICTs in the classroom to engage with course material provides students with many benefits but can be the cause of second level digital divides (Jesnek, 2012). Most institutions facilitate and supplement course content through online learning platforms such as Canvas or Blackboard; however, the requirement to navigate these technologies creates negative academic consequences for students who have low digital literacy (Jesnek, 2012; Reisdorf et al., 2020). A variety of ICTs, such as laptops with Internet connection and smartphones, may be used in the classroom to create in-class presentations or integrated into a lesson using apps such as Kahoot (Reisdorf et al., 2020). Incorporation of these ICTs can lead to engaging class sessions and are becoming important tools in the development of new literacies in the classroom (Shopova, 2014). There is risk in their incorporation as some students are not as technically well informed as their peers (Jesnek, 2012). This contributes to an inequitable disadvantage among students, including lower academic performance, and unintentional class time being used for instructors to teach these skills (Etka Jain, 2011; Jesnek, 2012). Varying levels of technological skill and understanding among students need to be considered when integrating technology into the classroom.

Level Three: Institutional Support Interventions

The final level offers colleges and universities opportunities to increase digital skillsets in students. The building of digital literacy skills for college students should be incorporated in K–12 education through the development of basic computer skills; however, it is not the primary and secondary educators' responsibility alone to progress these skills. Lack of funding in K–12 schools has left many without the necessary federal and state funding required to address information literacy (Buzzetto-Hollywood et al., 2018; Shopova, 2014). Higher education institutions can address the three levels of digital divides faced by students to positively impact student success. Institutions can foster the foundational and continued development of digital literacy skills through access and exposure by offering specific introductory courses that target this development and by integrating ICT usage across disciplines (Buzzetto-Hollywood et al., 2018; Shopova, 2014).

Institutions can address first level digital divides for students through device access and by understanding that students from low socioeconomic backgrounds may not be as familiar with ICTs as some of their more affluent peers (Campos-Castillo, 2014; Peña-López, 2010; Reisdorf et al., 2020). Some colleges have the financial ability to provide incoming students with a laptop; however, access to equipment is only one facet of concern. Once students receive the laptops, their technological inexperience does not prepare them for how to use the technology. Institutions need to do more to bridge the digital divide (Reisdorf et al., 2020). Colleges and universities can address first level divides through the loan of personal mobile devices, financial assistance to provide device ownership, increased classroom time to learn new behaviors, increasing Internet bandwidths on campuses to ensure students can access material, and the availability of additional courses or seminars to help bridge divides between those who can use technology and those who need to further develop their skills to meet the expectations of the college campus (Nataraj, 2014; Peña-López, 2010; Reisdorf et al., 2020; Ricoy et al., 2013). Once devices have been obtained, educators need to integrate interventions for students facing technological deficiencies early, specifically during the first year, to help develop students on how to use required technologies they may previously have not had experience with (whether for financial or other reasons). Such interventions cannot be determined without knowing where a student's skill set begins.

There can be a false assumption that students enter college with the necessary digital skillsets needed for success. This assumption can put students at a disadvantage before they ever step foot in a classroom (Buzzetto-Hollywood et al., 2018). Post-secondary institutions should test all incoming students to better understand their baseline technology literacy skills. Testing would provide quantifiable data to illuminate the deficits of knowledge that students may have to better support the growth and development of skills needed to successfully navigate the expectations of higher learning (Buzzetto-Hollywood et al., 2018; Jesnek, 2012). Traditional first-year students may go through such testing in some instances; however, this is not consistently done across all institutions. Adult and transfer students may not be required to do any testing.

Nataraj (2014) conducted a study investigating the need for an introductory computer course for incoming first-year students at a four-year institution. Faculty and administrator misconceptions about student literacy on the campus were that incoming students did not need such courses. The dominant attitude was that students had already learned these skills in high school rendering such classes unnecessary. Students enrolled across several sections of the "Introduction to Computers" course were administered a 50-question pretest and posttest covering topics of computer concepts including word processing, spreadsheet analysis, database management, presentation graphics, the Internet, and the worldwide web. The theory that students already developed these basic skillsets was proven statistically wrong and showed that students do benefit from taking introductory computer courses as their secondary education did not adequately prepare them for the expectations of the college classroom.

To address this second level divide, all students, regardless of the age category or academic year they fall into, should be offered the opportunity to take basic computer courses through their institution to ensure they have the basic skill set expected of them within the classroom (Jesnek, 2012). Institutions can provide additional seminars, integrate the development of foundational skills into current coursework, and offer other activities designed specifically to develop student's digital literacy (Peña-López, 2010; Shopova, 2014). Students who are low in digital literacy can be paired with a peer mentor who can help individuals to overcome self-efficacy issues to increase student technology engagement, understanding, and usage (Kinghorn, 2014).

Continued development and growth of a student's ICT knowledge and usage will positively affect outcomes of Internet use. According to Buzzetto-Hollywood et al. (2018), students who have had the opportunity to develop their digital literacy skills early have positive academic and later professional experiences. Students who learn how to use ICTs, and apply this knowledge to their courses, have greater self-efficacy and achieve better results in their learning process (Kitchen et al., 2021; Shopova, 2014). These students will make continued progress toward reaching their educational goal of obtaining a degree. Institutions will best meet their metrics of success by assisting their students early on and continuing to advance their digital literacy skills (Jesnek, 2012; Nataraj, 2014; Shopova, 2014). Providing equitable access to all students will break down digital divides and promote academic success for all (Nataraj, 2014; Shopova, 2014). This will positively benefit critical student success and college and university outcomes, such as retention and graduation rates, that all institutions are tasked with upholding.

Discussion and Conclusion

Implications for Higher Education

One of the overarching goals of higher education is to provide access to education and effective inclusion for all students (Shopova, 2014). Access extends beyond merely having campuses available that students can apply to and enroll in, but includes the socioeconomic advancement of students (Etka Jain, 2011). As institutions continue to build inclusive environments that provide such access for every type of student, including students from low-income households or first-generation students, considerations must be made for those that come to campus experiencing first, second, or third level digital divides (Buzzetto-Hollywood, 2018; Duart, 2010; Reisdorf et al., 2020). While some campuses may view digital divides as an impact affecting only a small percentage of students, the reality is that these divides are a serious issue for higher education. Institutions need to be mindful that most academic activities on campus require devices and knowledge of how to use these devices for students to be academically successful. Students who are less privileged either through their socioeconomic background, or those students who have not had the proper training to break through second-level divides, are those who become digitally excluded and continue to struggle academically (Buzzetto-Hollywood, 2018; Reisdorf et al., 2020). Institutions must equitably support the students they enroll. Colleges need to offer the support services to develop these skills in students and can no longer assume students have these skills because they are digital natives (Reisdorf et al., 2020). Institutions need to determine which interventions they can reasonably offer to ensure they are providing equitable access to all students to break down digital divides and to promote academic success for all.

Conclusion

The purpose of this narrative review was to explore reasons why college students come to campus with varying levels of technological competencies essential for advanced coursework and if there is a responsibility of institutions to provide equitable opportunities to develop students' digital literacy skills to promote increased student success (Nataraj, 2014; Shopova, 2014). The analysis of the

literature showed three levels of digital divides that college students' experience. First level divides were explored through socioeconomic effects of device ownership and Internet access (Campos-Castillo, 2014; Duart, 2010), second level divides reviewed digital literacy skills such as the ability to search digital libraries and navigate databases (Reisdorf et al., 2020), and the third level divide looked at outcomes of Internet use, specifically focusing on positive outcomes students can experience with the right education and support of device usage (Hargittai & Hinnant, 2008; Liebenberg et al., 2012; Reisdorf et al., 2020). Higher education faculty, staff, and administrators can support and develop positive student outcomes when institutions put efforts into place to help bridge digital divides for students. These interventions, such as the loaning or gift of devices and integration of skill building across multiple disciplines, create equitable opportunities for all students.

References

Corresponding Author: Ryan Hiller
Author Contact Information: hiller_ryan@yahoo.com

Banerjee, M. (2020). An exploratory study of online equity: Differential levels of technological access and technological efficacy among underserved and underrepresented student populations in higher education. *Interdisciplinary Journal of E-Skills and Lifelong Learning, 16,* 093–121. https://doi.org/10.28945/4664

Buzzetto-Hollywood, N., Hwei Wang, Elobeid, M., & Elobaid, M. (2018). Addressing information literacy and the digital divide in higher education. *Interdisciplinary Journal of E-Learning & Learning Objects*, *14*, 77–93. https://doi.org/10.28945/4029

Campos-Castillo, C. (2014). Revisiting the first-level digital divide in the United States: Gender and race/ethnicity patterns, 2007–2012. *Social Science Computer Review*, *33*(4), 423–439. https://doi.org/10.1177/0894439314547617

Duart, J. M. (2010). New digital divides in higher education. *RUSC: Revista de Universidad y Sociedad Del Conocimiento*, *7*(1), 1–2. https://doi.org/10.7238/rusc.v7i1.653

Ekta Jain, C. A. (2011). Enhancing quality and accessibility of higher education through use of technology. *Indian Journal of Higher Education*, *2*(2), 105–111.

Hargittai, E., & Hinnant, A. (2008). Digital inequality: Differences in young adults' use of the Internet. *Communication Research*, *35*(5), 602–621. https://doi.org/10.1177/0093650208321782

Jesnek, L. M. (2012). Empowering the non-traditional college student and bridging the digital divide. *Contemporary Issues in Education Research* (CIER), 5(1), 1. https://doi.org/10.19030/cier.v5i1.6780

Kinghorn, J. R. (2014). The new digital divide: Peer collaboration as a bridge. *AURCO Journal, 20*, 24–31.

Kitchen, J. A., Cole, D., Rivera, G., & Hallett, R. (2021). The impact of a college transition program proactive advising intervention on self-efficacy. *Journal of Student Affairs Research & Practice*, *58*(1), 29–43. https://doi.org/10.1080/19496591.2020.1717963

Liebenberg, H., Chetty, Y., & Prinsloo, P. (2012). Student access to and skills in using technology in an open and distance learning context. *The International Review of Research in Open and Distributed Learning*, *13*(4), 250. https://doi.org/10.19173/irrodl.v13i4.1303

Nataraj, S. (2014). The need for an introductory computer literacy course at the university level. *International Journal of Business Management and Economic Research (IJBMER)*, 5(4), 71–73.

Peña-López, I. (2010). From laptops to competencies: Bridging the digital divide in education. *RUSC: Revista de Universidad y Sociedad Del Conocimiento*, *7*(1), 21–32.

Reisdorf, B. C., Yankelevich, A., & Triwibowo, W. (2020). Laptop or bust: How lack of technology affects student achievement. *American Behavioral Scientist*, *64*(7), 927.

Ricoy, C., Felix, T., Joao Couto, M. (2013). The digital divide among university freshmen. *The Turkish Online Journal of Educational Technology*, 12 (2) 262–268. ISSN-1303-6521

Selwyn, N. (2010). Degrees of digital division: Reconsidering digital inequalities and contemporary higher education. *RUSC: Revista de Universidad y Sociedad Del Conocimiento*, 7(1), 33–42. https://doi.org/10.7238/rusc.v7i1.660

Shopova, T. (2014). Digital literacy of students and its improvement at the university. *Journal on Efficiency and Responsibility in Education and Science*, *7*(2), 26–32. https://doi.org/10.7160/eriesj.2014.070201

The persisting racial digital divide in internet access. (2010). *The Journal of Blacks in Higher Education*, *67*, 54–55.