TECHNOLOGY CONSIDERATIONS AND OPPORTUNITIES IN HIGHER EDUCATION

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We have no conflict of interest to disclose.

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Acknowledgments

Abstract

Technology has transformed teaching and learning by providing access to education that transcends the boundaries of race, gender inequity, costs, and physical constraints. The importance of providing professionals in higher education with a compilation of evidence-based findings, focused on the use of promising practices in technology and what is needed to create a learning environment that will meet the educational needs of students, is even more significant now in light of a worldwide Covid-19 pandemic. Based on the increased need for expanded knowledge on such practices, the authors have examined the importance of technology usage in developmental and transitional education courses; however, discussion is included on technology use in higher education courses, the transition from traditional seated courses to fully online delivery, the use of social media in the classroom, and the inclusion of cell phone technology in learning.

Technology Considerations and Opportunities in Higher Education

Issac Asimov once proclaimed, "…I do not fear computers. I fear the lack of them" (as cited in "Age of Miracle Chips," 1978, p. 45). Years later, Castells (2010) posited that we are now living in a distinct information age. In our current age, computers are perceived as being ubiquitous, even in regards to education, but it was in the 1960s when Lipsitz predicted this phenomenon (Kinshuk et al., 2013). The term "educational technology" has been commonly used. From online courses, cell phones, computers, Learning Management Systems (LMS) such as Moodle, and Blackboard, and social media avenues such as Facebook and Twitter, this article will offer a comprehensive examination of the value of the various educational technologies and the implications that accompany them. In higher education today, no matter the course level, technology can be viewed as a great equalizer, as evidenced in its accessibility. For example, in terms of educational technology, students and staff can communicate across cities, states, and continents. Technology applications currently in education are nearly infinite. The recent Covid-19 crisis has required all in higher education to use it, including many luddites (Gardner, 2020).

Hadadian et al. (2014) asserted that technology is quickly becoming a global phenomenon, increasingly seen in higher education classrooms. For instance, prospective international students can participate in virtual tours of many campuses in the United States from the comfort of their homes. This technology usage is just one example of how technology has connected people across oceans and continents.

Without a doubt, technology has profoundly altered the education experience. It has greatly expanded access to education as vast amounts of information (books, audio, images, videos, and podcasts) are available at one's fingertips through the world wide web. According to the U.S. Department of Education's (2017) Office of Educational Technology, formal learning opportunities can be easily accessed with platforms such as Khan Academy, Massive Open

Online Courses (MOOCS), podcasts, traditional online degree programs, and other learning resources. Technology has brought about the exposure to learning opportunities and digital connection in unprecedented possibilities. It is up to educators to adapt, if they have not already done so.

Attributes of College Students Enrolled in Higher Education

Enrollment in online courses rose at a faster pace between fall 2015 and 2016 when compared to the previous 3 years. Based on federal data from more than 4,700 colleges and universities, more than 6.3 million students in the U.S., most of whom were undergraduates, took at least one online course in fall 2016, a 5.6% increase from just a year before (Friedman, 2018). One societal benefit of online learning is increased access to higher education. Online education increases access to learning for anyone interested in attending college, particularly those students who have full-time work and/or family obligations who might not have otherwise entertained the notion of attaining a degree (Gannon, 2019).

Different generations are affected by different factors (Statnickė et al., 2019). Generation Z students have grown up with technology in all aspects of their lives. Generation Z students are considered the generation that was born between 1995 and 2012 (Persada et al., 2019). Many from this group are enrolled in high school and college education; this generation is dominated by Internet inclusion. Therefore, technology in education is expected as part of preparing today's students for the workforce. Amid the current global pandemic, elementary, middle, and high schools are providing instruction online in order to keep their students on task. These students, even though at home, get to see their friends and communicate with them like normal while working on classwork at the same time On the other hand, these students may miss out on the sense of community that they feel inside the traditional classroom, but this can be built inside an

online learning community as well. Instructors are able to track the progress of their students by joining breakout groups via Zoom or Google docs, but it is important that they take the time to develop a classroom community, especially in an online environment.

There are certain factors that help Generation Z students succeed in a fully online learning environment for communication skills. Out of a diverse group of learners, the student's institutions significantly impacted their preference for instructional delivery modality. The factors which lead to student success and retention in online courses are dependent on the characteristics of the student (Yu, 2020). Though creating a sense of community and belonging within the classroom is vital to overall student success and retention, methods for doing so vary by course design, as well as other factors.

A majority of students work to pay some, if not all, of their tuition and living expenses which is a reality and would prefer an online learning environment over traditional. In addition, these students become more responsible and efficient learners due to working independently in an online course environment, they are able to get a lot done in a small period of time with technology. According to Conference on College Composition & Communication (2013), appropriate composition teaching/learning strategies should be developed for the unique features of the online instructional environment.

Meeting Students Where They Are

In developmental education, math, integrated reading, and English courses, technology is a tool which can help bridge the gap among students who enter college immediately after high school and those who enroll after entering the workforce. Technological support for student learning in developmental math can improve student Lexile reading levels, grammar, and writing skills in integrated reading and/or English courses (standalone, transition, or integrated).

According to Kim (2019), while only 14% of undergraduate students study exclusively online, 30.7% of graduate students participate in courses in this manner.

Campus support services can set students, who enter college, especially in developmental and/or transition-level courses, up for success by acknowledging student deficits across disciplines. If the skill level of the student is not considered, then instructional design teams are creating a potential barrier to these students who lack the skills needed to be successful in college-level courses. If these deficits are not considered, pass rates in courses will decline.

Regarding modifications and accommodations, one important tool is the laptop. Students, for example, may require use of a laptop instead of another mobile device that fits learning needs. This technology provides full access to most computer programs, rather than a minimalist version that is meant to be used on phone apps. Because of the legal and ethical issues surrounding these students, such as ADA compliance or software licensing, it remains important to provide various technological resources to students.

Technology can be an equalizer for many students in the classroom. Using supplemental software programs can provide spelling, grammatical, calculating, and other resources to students who lack certain skill sets. While technology can be a positive addition to student learning in many cases, it can have negative connotations for some students. Hess (2019) presented studies which showed how powerful cell phones offered distraction to the most disciplined adults and student learners. Learners are also supported through embedded YouTube videos in the campus LMS while other learners can listen to lectures which are recorded in programs such as Jing. Other programs, like Camtasia, provide instructors opportunities to extend options to different modalities of learning.

Helping Students Underprepared to Succeed with Technology

There are certainly positive and negative aspects to using technology in developmental education courses. Up-to-date pedagogy needs to be adjusted to computerized environments, and that tasks cannot simply be transferred from traditional study environments to computerized one. However, there are no clear guidelines as to how to do this effectively (see Cheung & Slavin, 2013).

There are three phases to increasing college completion. The first is to improve the quality of teaching and learning in community college classrooms; the second phase is to fully integrate courses and student support services; and the third is to expand the connections between community colleges, public schools, and community services (Boylan et al., 2016).

Professional development is at the center of meeting phase one of Boylan's et al. (2016) plan and required a substantial faculty development effort. Faculty and staff members cannot adequately assist students underprepared in the use of technology if these professionals are not efficiently prepared. Professional development should include both full-time and adjunct instructors, as well as professional and paraprofessional staff members.

Creating a common campus culture with open communication lines is necessary for meeting phase two. Boylan et al. (2016) asserted that, at present, the academic and the student affairs divisions of community colleges usually operate randomly and independently of each other. Technology programs can help bridge this gap. Through technology such as Form Stack and similar software programs, online forms can replace papers ones which allows multiple departments immediate access to documentation. The DMI Daily Digest (2020) maintained that by using predictive analytics, this method examines data patterns to determine if those patterns will likely occur again. Institutions can then provide students with support services before

problems are encountered. The University of Nevada is already using analytics to pinpoint students who need earlier intervention. Using the insights yielded through predictive analytics, instructors' step in to provide timely interventions (DMI Digest, 2020).

In order to expand connections in phase three, Boylan et al. (2016) suggested that high schools and colleges collaborate more closely to ensure that the exit standards of secondary education are more consistent with the entry standards of postsecondary education. In addition, community colleges needed to establish better relationships with services available in the local community to address the varying non-academic needs of the least advantaged students. By embracing technology, these communication gaps can be met. For example, by using data gathered from their LMS, Georgia Southern was able to predict, measure and guide student performance for better graduation rates (DMI Digest, 2020). Through analyzing 53,000 data points the school gathered from 3,155 students, their system predicted a passing final grade with 82% accuracy at the course midpoint. Student progress was tracked to determine success or failure. As students continue to move through a course, the system's accuracy improves, with an 87% accuracy by the 16th week of a course. By leveraging this system, Georgia Southern aims to produce 250,000 more graduates in upcoming years. Through this extra attention to detail, universities are able to retain students and see them through to graduation (DMI Daily Digest, 2020).

Additionally, technology can serve as an integral part in meeting the current deficit of college graduates in the United States, as well as aiding students in completing college with less debt. Three factors—a shortage of college educated workers, the increased costs of a college education, and the increase in student debt—have captured the attention of policy makers in the

past decade. These factors can be mitigated using educational technology to move more classes, at all college levels, online (Boylan et al., 2017).

Each of these phases can be accomplished through the use of educational technology. Authors of an article published in DMI Daily Digest (2020) stated that as the cost of higher education has continued to rise for the past three decades, by an average of 3% each year, the need for finding additional ways to fund higher education has become a priority. As such, the phases outlined by Boylan et al. (2016) should be taken into consideration when implementing technology in developmental education classrooms. Technology, especially in this chaotic time for higher education, can help to alleviate each of these trends.

Developmental educators have been caught up in the completion agenda and subsequent reform movement, frequently having to completely change what they do, often without having any input into the change (Boylan et al., 2017). Primary and secondary stakeholders on campus have not had considerable input with curricular mandates from the state community college systems or legislature in many states but buy-in from these stakeholders is pivotal to successful implementation of innovations, such as increased technology use. By 2020, LMS use will become more significant, such as connecting students with advisors, making tuition bill-pay easier, offering a convenient way to make appointments with counselors, checking and submitting for financial aid, offering more robust job boards, and connecting current students with alumni (DMI Daily Digest, 2020).

Much has changed across higher education. With many courses going online (some for the first time), it is vital for all campus units to come together to support student success, retention, and persistence. Clear communication between campus departments, support—both technical and otherwise—and experimentation with innovative ideas are three points that can

help all of higher education to weather this pandemic and to come out the other side stronger and more ready to tackle the challenges facing twenty-first century students.

Since the Covid-19 pandemic has changed the higher education landscape so rapidly in such a short time period, instructors and staff members, must adjust to this metamorphosis. The authors acknowledge that there are many different positive and negative aspects of implementing supplemental technology. Educators must become familiar with the emergent technological and hybrid course formats now being adopted in higher education (see Figure 2). The chart below offers some helpful hints for the inclusion of supplemental and other technology in courses. The chart also lists several pitfalls instructors should try to avoid in making this transition.

The chart (see Figure 3) below should serve as a starting point for the addition or subtraction of supplemental technology to courses which now must be taught online. The hints listed above are general and can be applied to any campus as the culture and procedures do vary from campus to campus. Higher education professionals must reinvent how students succeed using technology in today's new normal.

Creating Parallels Among School and the Workforce

Student technology use can run the gamut. Before entering college, students are expected to know how to write and edit essays using various forms of technology. Students also must be prepared to create course presentations. After enrolling in college, students are expected to adapt to instructor communication preferences-written, verbal and digital. Today's college students should be able to navigate the internet and find credible resources to support their ideas. Technology can certainly enhance the classroom experience (Richmond & Troisi, 2018) by way of building relationships and communicating ideas. Students can use Smartboards, PowerPoints, Google docs, Pecha Kucha, MOOCs, databases, software programs, video lessons, self-testing,

and discussion forums to identify ways they can be successful learners (Richmond & Troisi, 2018). Learning the myriad ways of communication approaches are used in formal learning settings so they can apply this learning more readily in the workforce is vital for students. This knowledge can make the transition from college life to work life more seamless.

Digital Natives and Shifting the Paradigm

Au-Yong-Oliveira et al. (2018) conducted a study of 111 millennial students where research participants were asked to complete surveys on the leader attitude and higher education approaches they desired. The study results indicated a high value placed on technology in classes, particularly in Padlet.com, Moodle, online news forums, as well as students being tasked with producing their own videos focused on course learning. Shifts in technology, student diversity, and ever-changing educational practices can all inform how technology is used for learning in higher education. Being intentional with how technology is implemented in higher education learning can pave the way for a paradigm shift.

Possibly one avenue for online instructors to consider is to pursue simulation education (SE). In terms of benefits and value, authors Campos et al. (2020) make correlations between SE and student intrinsic motivation, and between SE and Science Technology Engineering and Math (STEM) programs of study like engineering and marine ecology. The team addressed the importance of "serious" game play (p. 3) in which gamers can improve decision making skills as they navigate realistic experiences playing games. Another platform that may be worthy of exploring in higher education is Artificial Intelligence (AI). Zawacki-Richter et al. (2019) reviewed how AI has been implemented in higher education and arrived at limited results, indicating that AI has mostly been used in computer science and STEM fields. However, these authors report AI is an emerging field and may enhance student learning outcomes.

Continuing further into options, and considering cultural factors that exist among students, is the notion of redeveloping a global MOOC to be more relevant locally. Chen and Oakley (2020) conducted a 3-year study that examined an English-Chinese MOOC "Learning How to Learn" (LHTL). The researchers determined that MOOCS could assist in sustainable course redevelopment in their research outcomes and suggested setting up comparable MOOCS, that are research embedded, can engage local partners, and allowed for MOOC instructor collaboration. This collaboration can produce a sustainable online model. Furthermore, Chen and Oakley (2020) indicated in their concluding remarks that, "Our work is a proof-of-concept, showing that creating a learning environment that enables domain-specific MOOC research is practicable" (p. 20).

Online Education and Creating Community

As evidenced in this article, there are several options for educators to explore in creating a quality online class. In times of crisis, like the Covid-19 pandemic, technology can not only save jobs but be instrumental in meeting student learning outcomes. An article in Forbes magazine by Star (2020) titled, "Online education becomes teacher's pet in Covid-19 Crisis" is just one source that points to the significant value technology presents in educational systems. While higher education instructors work diligently to determine the right online technology for their courses, it would behoove them to consider platforms and strategies that foster community among learners, as community is vital in times of crisis. Activity and discussion should focus on sharing realistic evidence, suggestions for practice, and use of the framework for faculty development and course (re)design (Garrison et al., 2000).

People's lives have been uprooted, problems need to be solved, and people need support and care. Perhaps this crisis is an opportunity for higher education systems to not only build their

resilience but is also a chance for them to integrate (perhaps more intentionally) community and relationship building into online courses. For instructors who are not familiar with online teaching, the current crisis could be stressful for them as they will need to spend hours figuring out how to make their virtual class "less boring." O'Malley (2017) suggested that being mentally present is important. This acuity includes actively engaging with students, posting bios, and encouraging students to do the same.

Studies and articles have addressed social justice and its place in educational systems. While social justice is a valid consideration given developmental classes, diverse learners, and varied teaching preferences of professors, systems can grapple with how to implement social justice tenets. The shift online could take several forms. First, if bad-experience stories circulate and have influence, it could see participation and even enrollment decline. Second, given equity issues worsened by recession, open education resources and open-access publishing could triumph. The pandemic may also see inequality drive different technology uses, with wealthier communities using more demanding technologies (virtual and mixed reality, telepresence) while poorer ones turn to tools with lower infrastructure demands (asynchronous video, audio, images and text) (Lederman, 2020). Guthrie and McCracken (2010) shared an idea about constructing intentionally designed courses that interconnected service learning, technology, and social justice in their research. Although this article was published ten years ago, much of what was discussed remains relevant to current issues and complexities in terms of educational instruction. Another notion might be to organically involve students in the complexities of solving such real-life problems by experimenting with various technology platforms to determine what may or may not work sustainably for higher education culture. By involving students, professors and learners have an opportunity to create meaningful relationships and thus, meaningful learning outcomes.

Learning Management Systems

LMS can be utilized in various ways across higher education courses. Course shells can be used as simple "shells" that hold the basic course information, such as rosters and syllabi or they can also be used as repositories for course materials and be a resource for students who miss class or have mislaid important information. The LMS can help further enhance the face-to-face classroom with online activities or assignments or the LMS could allow for blended or hybrid courses that are a mixture of face-to-face and online. The ways each institution and each faculty member handles trends, such as integrated reading and English courses or co-requisite education, tend to vary; however, as Rhode et al. (2017) observed in their study, there tends to be usage patterns that can emerge. Still, to create a fully online course a LMS is a must have for a university or college.

There are many LMS available; Blackboard, Canvas, D2L, and Moodle are currently among the biggest names. While there are many determining factors as to what LMS is ideal for courses/universities to use (cost, support, ease of use, and more), it really all depends on the purpose and outcomes desired from using it in courses. Washington (2019) argued that while online courses are key to LMS selection, the needs of face-to-face courses should also be taken into consideration.

LMS is a critical technology platform for teaching and learning for nearly all institutions of higher education. Although a LMS is a driving force in online courses, it is not always used in traditional face-to-face environments. Adding information in the LMS offers students course access which is available 24-hours a day (Washington, 2019). In the early days of online coursework, classes were not as interactive as they are now and it was difficult to ensure student accountability. However, using newer software applications like Zoom, a video communications

program that provides a platform for video and audio conferencing, chat, and webinars used within many institutions of higher education, allows students to interact with each other in breakout groups or as a whole class, as well as sharing and editing group assignments. Further, students who have families and/or work full time are more apt to apply to colleges that are flexible to their needs and preferences as they may want to multitask which is why it is important for Higher Education Institutions (HEIs) to wholly embrace virtual instruction. Synchronous and asynchronous online instruction both have merit. Alternative, self-paced, or experimental OWI models should be subject to the same principles of pedagogical soundness, teacher/designer preparation, and oversight that all courses are. This aids students in learning on their own schedule in an online learning environment (CCCC, 2013).

The problem is an underutilization of LMS in face-to-face higher education courses (Washington, 2019). Instructors, both adjunct and full-time, must be trained and encouraged to use the LMS as a part of all classes, both online and traditional (see Figure 3). Washington's study results identified the features and tools in the LMS used most frequently and how they were used in the LMS. Based on this study, it is possible to better understand the educational potential of the LMS to enhance traditional face-to-face courses.

Still, educational administrators and instructors recognize that there are benefits to working with LMS where student learning is concerned. LMS can both aid in integrating assessment measures as well as fostering self-directed learning (Hernandez-Garcia & Condi-Gonzales, 2016). These two features alone can be of value to institutions, but these attributes can certainly appeal to diverse learners and instructors who prefer more digital communication. Additionally, LMS helps make educational resources available to learners, and built in LMS functions can aid in obtaining social learning analytic data (Palahicky, 2015). In regard to

differentiated learning, LMS can support various methods of instruction when it comes to meeting learner needs (Palahicky, 2015). In this way, LMS can further aid in meeting students where they are.

However, an online course must be built by faculty members and staff. The more diversified the teaching and learning approaches, the more potential there is for teacher-student objectives to be met via course delivery. Instructional designers using best practices can work alongside faculty members to create successful student experiences (Sugar & Luterbach, 2016). Best practices are many and varied, and all should be explored fully. One, for instance, is discussed by Mtebe (2015) who found that coupling LMS with social media can prove beneficial in higher education courses as social media is a familiar platform that students utilize for communication and connection.

Cell Phones

Another relevant piece of technology is the smartphone. Ortiz and Greene (2019) contended that the use of mobile technology, such as smartphones and tablets and other handheld devices, is deeply embedded in everyday college life by Generation Z (students born between 1995 and 2010). The frequency with which Generation Z students use these mobile devices is exhibited by the way they access numerous digital tools and next generation technology. Watson (2020) stated that in their 2018 State of Gen Z study that 95% of the Generation Z population had a smartphone and 25% had a smartphone before age 10. Being connected 24/7 is the norm for these individuals.

Frequency counts were employed to determine numbers of student logins over 24 hours, student logins over days of the weeks, and preferred operating systems. The study reported that there were 14, 234 unique visitors, that Monday had the most logins of the days of the week, and

that the most frequent time of day for logins was 10 a.m. Interestingly, there were a robust number of logins between midnight and 6 a.m. (Ortiz & Greene, 2019).

This group uses technology in all aspects of their daily lives. From the data, we can argue that the lives of the majority of the current population depend on mobile devices and it is difficult to take away from them. Smartphones represent the evolution of the mobile telephone into a minicomputer that can be carried anywhere; this was different from merely incorporating technology into course curricula (McVay & Dyck, 2015). More faculty should embrace their technology use as learning tools. With the help of software applications like Microsoft Word, Adobe reader, iScanner, and DocuSign, students who cannot afford to purchase laptops tend to do their assignments, as well as complete and sign documents on the phone without any difficulty. The importance of mobile devices cannot be overlooked in this era and HEIs should consider this when making decisions concerning their students.

Barnwell (2016) posited that cell phones offer students from diverse backgrounds the same technological chance to be successful. The cell phone has changed and developed so rapidly during the past decade that it makes having one invaluable for various purposes (Ray, 2015). Cell phones today are much like minicomputers as some of them are the size of computer tablets. The convergence of all technology gadgets into one mobile device, like the cell phone, will continue to advance (Jones, 2020). Instructors take the technology lane by permitting students to access cell phones as teaching aids. Apps offered on cell phones can aid in student learning, such as Top Hat (Rimer, 2019).

Of course, there are concerns with cell phone use. Richmond and Troisi (2018) reported that when students have free reign to use their cells in class, they do not perform as well as they could have if they did not use their phones. Cell phones, therefore, could serve as a distraction.

While this may be the case, it would behoove instructors to determine the intention behind cell phones. For instance, would it be for a certain assignment or purpose? It is indeed a challenge for educators to capitalize on the pervasive use of cell phones by younger students.

Social Media

Many instructors have begun to embrace social media as part of their courses. According to The Derek Bok Center (2020) at Harvard University, since students are already using social media it could be beneficial for instructors to incorporate it into lectures and other course content. Blankenship (2011) contended that social media is implemented in the classroom in several ways. The Babson survey noted that 30% of online educators used social networks to communicate with their students (trading posts on blogs, for instance) while more than 52% used online videos, podcasts, blogs, and wikis during actual class meetings (Allen & Seaman, 2014). There are many options for integrating social media in formal learning environments. Examples ranged from using closed course groups on Facebook, adding YouTube videos in a lecture, to using Google slides.

There are facets of social media to consider before implementing it in course learning, such as literacy. Blankenship (2011) stated that five interconnected literacies exist in using social media in college courses. The first was attention as it is vital to know where and when to direct one's attention with social media inclusion. The second literacy entailed defining what it means for someone to be a good participant. Thirdly, online communities are built for collaboration. A fourth point is that one must be aware of the privacy settings and the perils of using social media as part of a course. Lastly, critical consumption, determining what is real as well as important and vice versa, describes the fifth literacy.

Social media platforms can be used in many ways to support higher education. These trends must be considered cautiously in using this technology as part of a college-level course. Social networking platforms (SNS) are commonly used in higher education. Many young adults used social networking sites (SNSs) to stay in touch with their friends as well as for entertainment (Islim & Sevim-Cirvak, 2019).

Faculty members and students are conscious about friend requests, as both groups are able to send and/or accept friend requests to/from each other without hesitation. Both positive and negative connotations can be applied to this aspect of social media. While allowing friend requests are not required to join closed groups, this allowed students a view into the personal postings of professors and vice-versa.

Faculty members preferred that students did not communicate with them via SNSs. Only one-third of the faculty members created groups on SNSs in order to communicate and share with their students (Islim & Sevim-Cirvak, 2019). Institutional SNS accounts and groups were seen as a requirement by both students and faculty members for announcements and sharing on an institutional level (see Figure 1).

Other SNS use involved course postings on Twitter in closed class groups for particular courses (see Figure 1). LinkedIn and Instagram are also used by some professors to support student learning. The use of closed courses on SNS sites is important as it embraces student technology interests while also allowing another outlet for students and instructors during the Covid-19 pandemic. There are other benefits of using a SNS as a part of college courses. This use will help with the issue of regular contact and communication between the instructor and student. Greene (2020) contended that the distinction between synchronous/asynchronous learning is more complicated than it looks.

Figure 1

Social Media Tools

Site	Positive	Negative
FaceBook	Private Messaging	Requires personal account
Twitter	Closed Groups	Requires personal account
LinkedIn	Private Messaging	No Closed Groups

Note. **This figure offers different tools available on social media sites.**

Online Courses

Darby (2019) expressed that online classes are here to stay. Therefore, determining how to run an online course is vital for instructors. Indisputably, online learning provides increased access to tertiary education (Gannon, 2019). According to the CCCC (2013), Principle 2 asserted that an online writing course should focus on writing and not on technology orientation or teaching students how to use learning and other technologies. This is an important point for campus Instructional Designers to consider. While instructors have been critical of computer-based writing instruction, the situation with Covid-19 will require revisiting how quality writing instruction measures can be included in online courses. Within all online instruction, referring students to online tutoring, campus-based tutoring, and other online writing resources should not be neglected.

While administrators are willing to offer online courses to varying degrees, conversely, formidable educators are not necessarily equipped or inclined to deal with all the technology

available to them to further develop their discipline. Alternative, self-paced, or experimental online writing instruction (OWI) models should be subject to the same principles of pedagogical soundness, teacher/designer preparation, and oversight detailed in this document (CCCC, 2013). Only about 33% of prospective online students said they perceived the quality of online education to be equivalent to face-to-face instruction. Furthermore, 36% of prospective students surveyed, cited a concern regarding employer acceptance of online education (Kumar, 2010).

In terms of students, online learning courses can result in decrements across learner populations. One research study (Xu & Jaggars, 2014) reported that males, younger students, Black students, and students with low grade point averages struggled more. Most online courses are still taught in a "virtual classroom" format in which the instructor has a defined schedule for covering curricula and classes are conducted over a set number of weeks. This format may not reach all students as it may be difficult to attain a sense of connection and community among learners (Mendenhall, 2011).

Educator reluctance, lack of skill, time constraints, lack of tech support, and low pay may all be variables as to why educators may not produce more creative class formats. Online writing teachers should receive fair and equitable compensation for their work. However, it is critical to consider different ways to reach students, so they are successful as online learners. Perhaps, students can help facilitate the process through peer education, co-teaching, and assigning creative implementation online course strategies (CCCC, 2013). Richmond and Troisi (2018) advocated that, when possible, instructors should approach learning in a multimodal and multifaceted way.

The inclusion of technology in college courses can cause frustration for the learner and the instructor when it comes to connectivity at student residences, whereby learners may not

have internet access for various reasons. This lack of consistency and access to technology can be an issue especially for students who live in rural areas (Koricich & Boylan, 2019). Students living in mountainous, rural, and non-mountainous areas can all be impacted by this problem. Not only does connectivity at home present a problem, but software cost and access can also be a concern.

In terms of software use, cost can be a prohibitive measure. If students have to pay for expensive software programs, then this can cause, or add to, their financial burden. According to Boylan et al. (2017), 81% of African-American students graduating with associate degrees are in debt (14% more than white students) and 66% of African-American and Latino students that borrow money drop out of for-profit colleges with debt loads. On the instructor's part, distinguishing what type of software to include required careful thought regarding the student's financial situation, accessibility, and skill level, among other contributing factors. Instructors must also gauge student readiness to use and access a particular software program.

Figure 2

Course Formats

Course Types	Definition
Traditional	Course where no online technology used — content is delivered in writing or orally.
Web Facilitated	Course that uses web-based technology to facilitate what is essentially a face-to-face course. May use a course management system (CMS) or web pages to post the syllabus and assignments.
Blended/Hybrid	Course that blends online and face-to-face delivery. Substantial proportion of the content is delivered online, typically uses online discussions, and typically has a reduced number of face-to-face meetings.
Online	A course where most or all of the content is delivered online. Typically have no face-to-face meetings.
Synchronous/Asynchronous	Synchronous learning is online education that happens in real time. Asynchronous learning occurs through online channels without real-time interactions. Many hybrid models include both.

Note. **This chart offers definitions for different types of courses taught in Higher Education (Adapted from Allen & Seaman, 2014).**

Figure 3

Helpful Hints for Technology in Higher Education

Start Small Change in departmental curriculum should be piloted on a small scale. Start small and then expand to the larger course offerings.	**Be Reasonable** Avoid burdening students with too much work in accelerated learning courses. Too much work can result in students dropping courses, as well as hindering student engagement, and decreasing motivation levels.
Be Flexible Initial plans for implementing innovations, especially technological ones, often have to be tweaked. Try different versions of assignment lists, pacing guides, and other supplemental materials.	**Don't Forget Training** Be sure to provide adequate training to faculty when using new technology. Training should be offered for both full-time and adjunct faculty.
Find Common Ground Use technology that all students can understand and benefit from. Amend assignment lists based on student performance on initial placement tests.	**Create Ease of Use** Be sure online material is easy to find and clearly listed on the main tool bar of the LMS. Order these appropriately as well.
Get Student Input Review how students feel about the inclusion of different forms of technology at the beginning, middle, and end of each course to help discern student engagement and whether the technology is beneficial to bolstering their skills.	**Get Approval** Do not use supplemental software programs that are not approved by your campus IT department. Doing so can cause issues with campus IT security protocols.
Find Other Avenues to Success Be open to creating micro-credentials and other offerings which can be gained strictly online. Some students might be interested in investing in a new degree or a new credential during the time they are quarantined at home.	**Know Your Limits** Do not go beyond the state, civic, or campus mandated requirements for implementing an innovation with technology at the current time. Stay within your campus' plan for making advances work.

Note. **This chart outlines some helpful tips for technology application in developmental education (Adapted from Boylan, 2002).**

A Call to Action

Although Covid-19 has created considerable upheaval globally, it also has created a chance for higher education systems to connect with learners in ways that may otherwise be left unexplored. Technology has provided a tool, or bridge, to help develop relationships and community among students and faculty across higher education environments. In these times, it is evident that communities across the globe need to find as many ways as possible to connect in meaningful ways. Students desire social connection, digital connection, and a sense of community and belonging. Numerous higher education systems have accepted this call to action by encouraging educators to do things differently, with greater intention and purposeful inclusion, in the construction of their virtual classrooms.

Wingenbach, the President of Hampshire College, in Massachusetts, stated that "designing online instruction is a discipline backed by decades of learning science… [it is] a process that takes months, if not sometimes years, to do properly…" (as cited in Gardner, 2020, para 4). While many institutions have offered certain courses online over the past decade, others have been taught strictly in a traditional classroom setting. Instructors, both adjunct and full-time, need as much support as possible in working through this forced transition. Campus trainings and webinars can be paramount to student success and retention in this new environment.

Many colleges are proceeding with online instruction using their existing LMS and common conferencing software, like Zoom, for lectures and discussions. It is important to transition to this format with flexibility. Creating materials, such as pacing guides and course modules, are helpful in this transition (Gardner, 2020). With all instruction moving online at most colleges and universities following this year's extended spring break, an important point to

keep in mind is that faculty should be allowed to use the technology that they are comfortable

with during the transition (Gardner, 2020). A majority of college faculty are trained in basic use

of the campus LMS; this training is a step in the right direction.

References

Age of miracle chips. (1978, February 20). *Time, 111*(8), 44–45.

Allen, I. E., & Seaman, J. (2014, January). *Grade change: Tracking online education in the united states*. Babson Survey Group.

http://www.onlinelearningsurvey.com/reports/gradechange.pdf

Au-Yong-Oliveira, M., Goncalves, R., Martins, J., & Branco, F. (2018). The social impact of technology on millennials and consequences for higher education and leadership. *Telematics and Informatics*, *35*(4), 954–963. https://doi.org/10.1016/j.tele.2017.10.007

Barnwell, P. (2016, April 27). Do smartphones have a place in the classroom? From middle schools to colleges, cellphones' adverse effects on student achievement may outweigh their potential as a learning tool. *The Atlantic.* https://www.theatlantic.com/education/archive/2016/04/do-smartphones-have-a-place-in-the-classroom/480231/

Blankenship, M. (2011, September 17). How social media can and should impact higher education. *EdDigest: Essential Readings Condensed for Quick Review, 76*(7), 39–42. http://www.eddigest.com/

Boylan, H. R. (2002). *What works: Research-based best practices in developmental education.* Boone, NC: Continuous Quality Improvement Network with the National Center for Developmental Education, Appalachian State University.

Boylan, H. R., Calderwood, B. J., & Bonham, B. S. (2016). *College completion: Focus on the finish line*. [White paper]. National Center for Developmental Education, Appalachian State University.

https://ncde.appstate.edu/sites/ncde.appstate.edu/files/College%20Completion%20w%20

pg.%201%20per%20bjc%20suggestion.pdf

Boylan, H. R., Brown, P. L., & Anthony, S. W. (2017). The "perfect storm" of policy issues and

its impact on Developmental Education. *NADE Digest*, *9*(1), 2–7.

https://thenoss.org/resources/Documents/Newsletters/NADE%20DIGEST%20Fall%2020

17%20for%20WEB.pdf

Campos, N., Nogal, M., Caliz, C. & Juan, A. A. (2020). Simulation-based education involving

online and on-campus models in different European universities. *International Journal of

Educational Technology in Higher Education, 17*(8). https://doi.org/10.1186/s41239-020-

0181-y

Castells, M. (2010). *The rise of the network society* (2nd ed.). Wiley-Blackwell.

Chen, K., & Oakley, B. (2020). Redeveloping a global MOOC to be more locally relevant:

Design-based research. *International Journal of Educational Technology in Higher

Education*, *11*(9).

https://educationaltechnologyjournal.springeropen.com/articles/10.1186/s41239-020-

0178-6

Cheung, A., & Slavin, R. E. (2013, June). The effectiveness of educational technology

applications for enhancing mathematics achievement in K-12 classrooms: A meta-

analysis. *Educational Research Review*, 9, 88–113.

https://doi.org/10.1016/j.edurev.2013.01.001

Conference on College Composition & Communication. (2013, March). *A position statement of

principles and example effective practices for online writing instruction (OWI).*

https://cccc.ncte.org/cccc/resources/positions/owiprinciples

Darby, F. (2019, April 17). How to be a better online teacher. *The Chronicle of Higher Education*. https://www.chronicle.com/interactives/advice-online-teaching

Derek Bok Center. (2020). *Technology and student distraction*. Harvard University. https://bokcenter.harvard.edu/technology-and-student-distraction

DMI Digest. (2020). *What will higher education look like in 2020?* https://digitalmarketinginstitute.com/en-us/blog/what-will-higher-education-look-like-in-2020

Friedman, J. (2018, January 11). Study: More students are enrolling in online courses. *U.S. News and World Report*. https://www.usnews.com/higher-education/online-education/articles/2018-01-11/study-more-students-are-enrolling-in-online-courses

Gannon, K. (2019, March 25). 4 lessons from moving a face-to-face course online. *Chronicle of Higher Education*. https://chroniclevitae.com/news/2176-4-lessons-from-moving-a-face-to-face-course-online

Gardner, L. (2020, March 20). COVID 19 has forced higher education to pivot to online learning. Here are 7 takeaways so far. *The Chronicle of Higher Education*. https://www.chronicle.com/article/Covid-19-Has-Forced-Higher-Ed/248297

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher educationmodel. *The Internet and Higher Education*, 2(2-3), 87-105. http://cde.athabascau.ca/coi_site/documents/Garrison_Anderson_Archer_Critical_Inquiry_model.pdf

Greene, G. (2020, March 17). Keep calm and keep teaching: Shifting unexpectedly to remote

   instruction requires as many human solutions as technology solutions. *Inside Higher Ed*.

   https://www.insidehighered.com/advice/2020/03/17/shifting-unexpectedly-remote-

   instruction-requires-many-human-solutions-tech

Guthrie, K. L., & McCracken, H. (2010). Teaching and learning social justice through online

   service learning courses. *The International Review of Research in Open and Distributed

   Learning, 11*(3), 78–94. http://www.irrodl.org/index.php/irrodl/article/view/894/1629

Hadadian, A., Jones, R. E., & Yssel, N. (2014). College teaching: Marching to the tune of

   technology. *Journal of Technologies in Education, 10*(1), 1–9.

   https://doi.org/10.18848/2381-9243/cgp/v10i01/56467

 Hernandez-Garcia, A., & Conde-Gonzales, M. A. (2016). Bridging the gap between learning

   management systems and social network learning analytics in online learning. *Journal of

   Information Technology Research 9*(4), 1–15. https://doi.org/10.4018/jitr.2016100101

Hess, A. (2019). *Research continually shows how distracting cell phones are—so some schools

   want to ban them*. CNBC Make it. https://www.cnbc.com/2019/01/18/research-shows-

   that-cell-phones-distract-students--so-france-banned-them-in-school--.html

Islim, O. F., & Sevim-Cirak, N. (2019). Faculty members vs students: How they use social

   networking sites personally and educationally. *Acta Didactica Napocensia,* 12(2), 1.

   https://files.eric.ed.gov/fulltext/EJ1238610.pdf

Kim, J. (2019, December 11). Prioritizing faculty in online education: Why smart schools put

   professors first. *Inside Higher Ed.* https://www.insidehighered.com/blogs/technology-

   and-learning/prioritizing-faculty-online-education

Kinshuk, H., Demetrios S., & Nian-Shing, C. (2013). Grand challenges and research directions in e-learning of the 21th Century. *Journal of Educational Technology & Society*, *16*(2), 3–20. https://www.jstor.org/stable/jeductechsoci.16.issue-2

Koricich, A., & Boylan, H. R. (2019). *The importance of developmental education in rural communities*. [White paper]. National Center for Developmental Education, Appalachian State University. https://ncde.appstate.edu/sites/ncde.appstate.edu/files/Rural%20Developmental%20Education.pdf

Kumar, D. (2010). *Pros and cons of online education*. NC State Industry Expansion Solutions. North Carolina State University. [White paper]. https://www.ies.ncsu.edu/resources/white-papers/pros-and-cons-of-online-education/

Lederman, D. (2020, March 25). The shift to remote learning: The human element. *Inside Higher Ed. https://www.insidehighered.com/digital-learning/article/2020/03/25/how-shift-remote-learning-might-affect-students-instructors-and*

McVay, D.V, & Dyck, J. L. (2015). Using smartphones in the college classroom. *Encyclopedia of Mobile Phone Behavior*. https://doi.org/10.4018/978-1-4666-8239-9

Mendenhall, R. H. (2011, November, 6). How technology can improve online learning—and learning in general. *The Chronicle of Higher Education*. https://www.chronicle.com/article/How-Technology-Can-Improve/129616

Mtebe, J.S. (2015). Learning management system success: Increasing learning management system usage in higher education in sub-Saharan Africa. *International Journal of Education and Development Using Information and Communication Technologies*, *11*(2), 51–64.

https://www.researchgate.net/publication/288670218_Learning_Management_System_su ccess_Increasing_Learning_Management_System_usage_in_higher_education_in_sub-Saharan_Africa

O'Malley, S. (2017, July 12). Effective teaching online. *Inside Higher Ed*. https://www.insidehighered.com/digital-learning/article/2017/07/12/7-guidelines-effective-teaching-online

Ortiz, S., & Green, M. (2019). Trends and patterns of mobile learning: A study of mobile learning management system access. *Turkish Online Journal of Distance Education, 20*(1), 161. https://doi.org/10.17718/tojde.522464

Palahicky, S. (2015). Utilizing learning management system (LMS) tools to achieve differentiated instruction. In J. Keengwe & J. J. Agamba (Eds.), *Models for improving and optimizing online and blended learning in higher education* (pp. 12–33). Information Science Reference. Athabasca University. https://doi.org/10.4018/978-1-4666-6280-3.ch002

Persada, S., Miraja, B., & Nadlifatin, R. (2019, February 8). Understanding the Generation Z behavior on d-learning: A unified theory of acceptance and use of technology (UTAUT) approach. *International Journal of Emerging Technologies in Learning, 14*(5), 20–33. https://doi.org/10.3991/ijet.v14i05.9993

Ray, A. (2015, January 22). *The history and evolution of cell phones*. The Art Institute. https://www.artinstitutes.edu/about/blog/the-history-and-evolution-of-cell-phones

Rhode, J., Richter, S., Gowen, P., Miller, T., & Wills, C. (2017). Understanding faculty use of the learning management system. *Online Learning*, *21*(3), 68–86. https://files.eric.ed.gov/fulltext/EJ1154161.pdf

Richmond, A.S., & Troisi, J.D. (2018, December 12). Technology in the classroom: What the

    research tells us. *Inside Higher Ed.* https://www.insidehighered.com/digital-

    learning/views/2018/12/12/what-research-tells-us-about-using-technology-classroom-

    opinion

Rimer, S. (2019). Ban or embrace: Professors share strategies for cell phones in class: The only

    certainty: There is no right or wrong plan. *BU Today.*

    http://www.bu.edu/articles/2019/cell-phones-in-the-classroom/

Star, M. G. (2020). *Online education becomes a teacher's pet in COVID 19 crisis.*

    https://www.forbes.com/sites/mergermarket/2020/03/20/online-education-becomes-

    teachers-pet-in-covid-19-crisis/#493ddfee1aa1

Statnickė, G., Savanevičienė, A., & Šakys, I. (2019). The relationship between work engagement

    of different generations and mobile learning. *Acta Universitatis Agriculturae et*

    Silviculturae Mendelianae Brunensis, *67*(6), 16–27.

    https://doi.org/10.11118/actaun201967061627

Sugar, W., & Luterbach, K. (2016). Using critical incidents of instructional design and

    multimedia production activities to investigate instructional designers' current practices

    and roles. *Educational Technology Research & Development*, *64*(2), 285–312.

    https://doi-org.ezproxy.shsu.edu/10.1007/s11423-015-9414-5

U. S. Department of Education. (2017). *Reimagining the role of technology in education: 2017*

    national education technology plan update. Office of Educational Technology: Author.

    https://tech.ed.gov/files/2017/01/NETP17.pdf

Washington, G. Y. (2019). The learning management system matters in face-to-face higher education courses. *Journal of Educational Technology Systems*, *48*(2), 255. https://doi.org/10.1177/0047239519874037

Xu, D., & Jaggars, S. (2014). Performance gaps between online and face-to-face courses: Differences across types of students and academic subject areas, *The Journal of Higher Education*, *85*(5), 633–659. https://doi.org/10.1080/00221546.2014.11777343

Yu, E. (2020). Student-inspired optimal design of online learning for Generation Z. *Journal of Educators Online*, *17*(1), 1–11. https://www.thejeo.com/archive/archive/2020_71/yupdf

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education—Where are the educators? *International Journal of Educational Technology in Higher Education.* https://doi.org/10.1186/s41239-019-0171-0