

TECHNOLOGY AND THE INSTRUCTOR: WHERE TO NOW?

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Abstract

The purpose of this paper is to deliver a historical framework as it relates to Learning Technologies so to provide foundational knowledge for its evidential and continuing growth. As such, the advance in technology has allowed the proverbial lecturing professor to focus on instructional design thus creating a user-friendly environment for the learner. In this type of technological environment, the instructor assumes the position of being a guiding hand and promoter of critical thought while supporting students in deciphering a truth from a falsehood. In writing this paper, my hopes are fourfold: 1) Provide supporting evidence as it relates to the instructor's role, 2) offer examples of what other higher educational institutions are doing in terms of educating with technology, 3) showcase the applicable alternatives to traditional learning, and 4) provide speculation on the future of LTEC. It is my belief that if we can understand our initial formation and present atmosphere, then we should have a sense of forecast concerning our future. If successful in my purpose, then both reader and writer should come away with a better understanding of the higher educational environment and its relationship with technology.

Keywords: technology, instructional design, education, learning, historical, instructor.

1 INTRODUCTION

In speaking on education, and the environment in which we live today, the teacher is a central figure whose role has the potential to steer students down many a career path. From my own experience, my early-childhood teachers each made an indelible mark on my life. All three played the role of a second mother while guiding my mind towards a love for learning (this being the early to mid-90's). She would teach, write on a chalkboard, engage our mind in various hands-on activities, and move about the class to see if we were progressing in our skills. Then, through our human ingenuity, computers became portable, phones became mobile, and we each caught a wave while surfing the web. Instant gratification became the name of the game as we hooked our brains to a teleological nirvana. As a result, the onus seemed to shift as the instructor was no longer strictly a dispenser of information. In truth, we divorced tradition, married with technology, and allowed the instructor to assume the role of a guiding facilitator and mediator. The days of lecturing the student and being the sole source from which to obtain information was replaced with a newer, younger model.

In return, we now have multiple avenues in which to quench our curiosities with the caveat being in determining what is foundational knowledge, and what is quicksand. Open educational resources in the form of YouTube videos, Khan Academy, and other online educational systems are growing as potential learners seek to broaden their skillset and capabilities. Due to this, artificial intelligence, machine learning, learning analytics, and social media are proving to be breeding grounds for a new type of student; one that is multidimensional, technological savvy, and able to digest copious amounts of information.

2 LITERATURE REVIEW

According to Edgar [1], "The human race has always felt the need to understand our surroundings, our existence, and our mind. Learning has been seen as a necessity to grow mentally and societal-wise" [1, p. 2]. Our species has thought our way in-and-out of problems as though it were a rite of passage (and is it not to an extent?). We learn from our mistakes, or we do not, and fail or grow stagnant. Truth is, we are geared toward solving problems. For example, let us explore the development of our educational system and how we have progressed from being "remember what I tell you," to that of "learn by what I am doing."

Let us use the classic work of Meno as an example. In Meno, Socrates and Meno are trying to settle on a satisfactory definition of virtue. Throughout the dialogue, many avenues are explored as to its potential meaning, yet a clear-cut answer is never given. We are left with Socrates saying that "virtue appears to

be present in those of us who may possess it as a gift from the gods" [2, p. 32]. His conversational style with Meno, and the rationalist method in which he approached his reasoning, was a major school of thought in 350 BC. According to Edgar [1], "Recitation literacy was prevalent because it was a common belief that the mind was a gift from God and not to be questioned. Although scientific understandings of the mind have been postulated for centuries, it was not until the 19th century that scientific understanding of the mind started forming" [1, p. 1]. Schools in the 19th century were geared toward teaching the student how to read, write, and solve basic arithmetic [1]. If you were fortunate enough to have been born with a silver spoon in your mouth, then the notion of college enrollment was a viable option. Largely however, students would enter the workforce to help the family unit [1].

The early beginnings of the 20th century gave rise to prominent figures such as Jean Piaget and his theories on stage development, Freud and his work concerning the influence on emotions as it relates to the cognitive process, and John Dewey whose "work on schooling and pedagogy did not specifically imply a learning theory, but his child-centered approach and ideas of 'learning by doing' were very influential, taking up such essential angles as experience and motivation and distinguishing between the logical and psychological organization of learning processes" [3, p. 88].

The mid-to-latter half of the 20th century featured a whirlwind of change. Wars and a depression walked jointly with civil rights and technological advancements. New demands in the form of military aircraft and space shuttles created a need for more complex forms of learning. The needs of the time called our minds to action, and we responded accordingly. B.F. Skinner's theory on behaviorism was being replaced by Gagne's theory of the conditions of learning, and "it was no longer impossible to question behaviorism as the only acceptable way of dealing with human learning" [3, p. 89]. The 1980's saw rise to the development of the personal computer. Though still in its infancy, the "computer was gaining recognition for its abilities and uses and was envisioned to impact education heavily" [1, p. 2]. In 1983, David Merrill developed his CDT theory and PLATO was one of the first computer systems to be integrated into the instructional realm. The 1990's brought Constructivism to the forefront, process improvement, prototyping, and computer-based training modules. E-Learning was becoming mainstream with the prevailing thought being that it would reduce costs and establish a set of e-learning standards. And so, behaviorism, and its forms of conditioning, gave way to cognitive theories which led us to social constructivism and where we are now in our current information overload era.

2.1 The Last 25 Years

The web was becoming more popular and "there was a general sense of puzzlement about what it would mean, both for society more generally and for higher education in particular" [4, p. 2]. E-Learning was becoming mainstream with the prevailing thought being that it would reduce costs and establish a set of e-learning standards "that could be used in virtual learning environments (VLEs). Prior to this, considerable overhead was involved in switching content from one platform to another" [4, p. 4]. Open educational resources (OER's), blogs, and Learning Management Systems (LMS) all spawned and followed suit because of the interest in online education.

In 2002, "MIT's goal was to make all the learning materials used in its 1,800 courses available via the internet, where the resources could be used and repurposed as desired by others, without charge" [4, p. 4]. While the concept did not have the anticipated impact, free educational resources are an incredible asset for the money-deprived college student. In 2004, LMS's took hold and provided an organized and reliable method to host e-learning across an educational institution [4]. Prior to this organizational revival, e-learning tools were used according to the interest of the user. Meaning, the tools "varied across any one higher education institution, with the medical school adopting one set of tools, the engineering school another, the humanities school yet another, and so on" [4, p. 6]. The intention was right, yet the indiscriminate manner in how tools were chosen created a sense of unorganized learning.

In 2005 YouTube was launched, and a new era of educational videos were born. Though it probably was not intended to suffice as an educational resource, "a large amount of learning content makes YouTube a valuable learning resource for individual learners to engage in on-demand learning in school, work and/or everyday life, with low cost and high flexibility in time and location" [5, p. 339]. Social media and Web 2.0 technologies were all the rage in the mid-to-late 2000's. The interoperable nature of these websites allowed users to communicate and share material in an active manner. "While the quality of much online content was poor, there was always an aspect of what was "good enough" for any learner" [4, p. 7].

In 2012, the MOOC arrived. Think of it this way: What do you get when you combine OER's, videos, and social media? Massive Open Online Content allowed the learner to access copious amounts of

educational resources that was otherwise reserved for the college student. According to Arnavut et al. [6], “universities such as Stanford University, MIT, University of Pennsylvania, University of Michigan and Harvard University are the universities that most use the MOOC” [6, p. 83]. Khan Academy introduced an era of personalized learning on a variety of subjects for the learner. “The categories include math, science, economics/ finance, arts/humanities, computing, and test prep” [7, p. 2]. Learning was shifting towards a student-centered approach as educational technology tools became more available and easier to navigate. Digital badges became a way for the learner to showcase their educational achievements in the online environment. Similar in concept to being awarded a certificate, “digital badges help to represent skills and achievements of a person” [8, p. 1818].

In 2020, the COVID-19 pandemic arrived and forced learning to strictly adhere to a remote environment. In-person instruction halted, and students were sent home to operate under new learning standards while being taught via a variety of platforms: Google Meet, Zoom, Microsoft Teams, etc. According to Gillis and Krull [9], students “had to adjust to these new course structures along with many added barriers in their own lives that made completing their academic work more difficult” [9, p. 283]. For those students who relied on the institutions’ computer labs and Internet connection to complete their coursework, this shift in learning meant accessing their coursework via a mobile device. According to Antee [10], “digital literacy deficits and limited access to a mobile device or the Internet can be difficult to overcome in situations where students, currently attending a university or college, must transition from face-to-face instruction to online” [10, p. 193].

2.2 Applicability in Education

In our current environment, a virus has forced us to rely on technology, teach through a camera, learn from a screen, and hope that we are making the best decisions with the data available to us. So, what does this mean for the future of education? Is our “new normal” the future, or are we simply making the best of a bad situation? It is my opinion and belief that the learning environment does best when being conducted either in-person, or a hybrid format. My belief is directed at K-12 education as the level of student in those grades require more than just book learning. Referencing Vygotsky’s sociocultural theory, the school environment is also teaching students how to become responsible citizens. The development that takes place while conversing with peers, or interacting with teachers, assists the learner in their cognitive development. Schiff [11] noted that “distance education advocates... failed to sufficiently appreciate how much educational quality depends on human interaction and teachers” [11, p. 334-345].

Yet, higher-education institutions have to largely embrace distance education due to students having to work and manage their household. According to Slover and Mandernach [12], “the long-held assumption is that traditional classroom learning leads to better student performance, but results from the research suggests that equivalent learning activities occur in both online and traditional classroom settings” [12, p. 2]. In a study conducted by Mikropoulos and Natsis [13], the authors reviewed empirical research articles that dealt with the topic of educational virtual environments. Various databases were searched for specific keywords (virtual environment, virtual reality, etc.) and a total of 53 studies, published between 1999-2009, were found. From this, the authors were also curious to know which articles followed the tenets established by Jonassen’ seven principles of constructive learning. 33 of the studies were conducted in an educational environment and 40 of the studies refer to STEM topics. Interestingly, the authors noted that social science instructors also used VR but to a different extent (contextualization vs abstraction). In conclusion, the authors agreed with Higgins and Spitulnik [14] when they stated that “despite the promise of technology for instruction, research to date has indicated that teachers tend to use new technologies to support existing practices, rather than developing methodologies more suited to the unique affordances of educational technology” [14, p. 778].

This finding provides support to James Greeno’s [15] work involving Gibson’s Affordance Theory. This theory states that there are “affordances” or clues within our environment and how we perceive and interact with those clues are the basis for a decision or action to be made. Greeno [15] states that “affordances are, in this view, preconditions for activity, as I believe is made clearer when they are treated as conditions for constraint” [15, p. 340]. Humans modify their environment to obtain the desired response one is seeking. When we see a doorknob or a door leading to the destination we are attempting to arrive at, we pick up on affordances that prompt us to act, i.e., turning the doorknob or opening the door. The more we learn about our surroundings and how we perceive and interact with it, then our actions begin to make sense and our decisions more logical. Greeno expanded on his thoughts and added conditional constraints to his theory in that the constraint must follow certain conditions that exist in the background [15].

Scarantino [16] attempted to clarify some of the nuances of Gibson's theory while also expanding on the nature characteristics of affordances. He states that affordances are more than just a singular event in which "their manifestation is always constituted by an event in which the affordance-bearer X and the organism O are both involved" [16, p. 957]. The author believes that a distinctive class of new affordances, goal and happening, to describe events that are happening to someone, or events that someone does. The distinction brings into account the differing degrees in which an event can happen, the current ability of the affordance, as well as the certain and probabilistic outcomes that could occur.

The prior studies are listed to illustrate the role in which we modify our environment and shape the technological influences available to us. These influences are so intertwined with our surroundings that George Siemen's [17] foundational paper, *Connectivism: A learning theory for the digital age*, attempts to show the role in which technology has on our learning process. His paper proposed certain tenets such as: 1) Learning is a process involving the connection of nodes, 2) learning and technology are intricately linked, 3) Diversity of opinion, and the ability to perceive connections, are fundamental to learning, 4) connections must be formed and maintained and, 5) evaluating information is a skill that represents the learning process [17]. These facets emphasize the learners' ability to process knowledge that is stored and biased via technology. The ability of the user to make connections is central to the connectivist theory, thus adding to the notion that learning occurs by developing a network, establishing connections, and learning through the pathway that is formed.

2.3 Examples in Education with Connectivism

In a study conducted by Tham et al. [18], the authors were interested in how Connectivism can be applied cross-culturally through three learning experiences: The Trans-Atlantic and Pacific Project (TAPP), Personal Learning Networks (PLN), and the Fabric of Digital Life (Fabric). TAPP emphasized multiple stages in the Connectivist theory by allowing students to partner with students at a university in Spain. Through oral presentations, reflections, and establishing commonalities, students were able to form connection nodes, establish connections via a chosen technology, learn about different viewpoints, and finally unify their thoughts by reflecting on their experience. In the PLN example, "student development of visualizations of their individual learning networks provides a means to both document their awareness and receptivity to connections and also begin to sort and filter the enormous flows of information available" [18, p. 11]. The instructors allowed the students to design a visualization as a way to introduce themselves to their Spanish partner. The differing designs emphasized Stages 4 & 5 in the connectivism process by allowing the students to focus on the connections they formed via a diagram. Through learning networks, the students were able to witness firsthand the construction and facilitation of connectivism. Lastly, the students utilized a digital archive and increased their knowledge on digital literacy and by determining what contributions would be accepted onto the platform. This allowed the students to further examine the interconnected networks that broadened their learning experience by reflecting on the awareness needed in making decisions that affect their learning.

The researchers concluded that through the aforementioned examples, the students gained an intercultural competence in collaborating with other nationalities, formed new connections, and learned from their communication on how to best proceed with their course assignments [18]. Also, by growing their learning network, the students were able to decipher and filter through flows of information that illustrated their unique cultures and individuality. This allowed the students to reflect on their purposeful connections and taught them the value of modifying connections as they deemed fit. Finally, when working with the digital archive known as Fabric, students were able to modify and contribute content that increased their digital literacy and showcased their understanding of emerging patterns in a networked society.

Similarly, Barnett et al. [19], explored the use of Connectivism by implementing the theory in an online program at a Canadian university. The instructor and 17 students were tasked with teaching one module of the course. This created 18 week-long modules for a ten-week course; so, for some weeks, two modules were offered. The authors' goals were threefold in that they wanted 1) to describe this particular course as a model of connectivism in itself, 2) to make inferences based upon our evolving understanding about connectivism as a learning model, and 3) to analyze the implications of this course as a learning model through the lens of our experiences in it. "In order to create both trustworthiness and authenticity in the data collection, we decided to chat online with each other in a series of online conversations over the course of two months and these conversations would comprise the data collected" [19, p. 691]. From these conversations, the data emerged, and each researcher coded the data alone while making a dictionary of the codes created. This allowed them to then compare their work with one another and create a list of codes that represented their thoughts on the course experience.

Four main ideas emerged from the data: Learning theory; course content, context, or progress; student experience; and instruction. For the sake of brevity, the following statements sum up the authors' findings as it relates to each idea:

- Connectivism as a learning theory occurs across both brain and artificial intelligences; learning occurred as a group working together; top-down approach may be better in certain situations due to the amount of knowledge the instructor possess; democratic network of learning.
- Course content was decided on the instructor wanting to implement a social networking form of teaching; a lot of planning went into design; student apprehension; student flexibility.
- Students' experience was described as comfortable due to the personal experience it provided; voicing opinions was appreciated; time-commitment requirements were needed; unsure on how their design and teaching would go; discussion forums were lively.
- The instructor experienced a loss of control due to the course design; forced to share power; need institutional freedom for a pure connectivist course to work.

In another example of implementing alternative modes of education, Cleary [20] explored Connectivism as it relates to Technical and Professional Communication (TPC) programs. The author lays out a comprehensive literature review where she details the main tenants of Connectivism and how the defining principles can influence the learner to seek information "dynamically rather than seeking to acquire fixed knowledge; furthermore, the learner's ability to make decisions and prioritize is highlighted" [20, p. 14]. These principles, summarized and shortened for brevity, are: Learning occurs via diversity of thought and connecting specialized information nodes; nurturing connections is needed to facilitate learning and a capacity for wanting to learn is paramount; decision-making and current information is key in learning activities; and the ability to form connections and differentiate information affects the learning landscape. Due to the interconnected nature of Connectivism, the author states that the Col framework is a valuable tool in "online learning design and has amassed theoretical and empirical support. It is, thus, a relevant tool for developing and analyzing, especially online, learning environments" [20, p. 15]. This framework incorporates three types of "presence" that are vital for learning to occur: 1) teaching presence- activities developed by the teacher to support learning, 2) social presence- the learning environment and how students interact with their peers, and 3) cognitive presence- how learners construct meaning and build knowledge domains. Both Col and Connectivism rely on interaction as a main driver in the online educational experience and further highlight the need for peer related activities within the learning community.

As mentioned above, the purpose of the article is to showcase two examples in which the researcher incorporates a connectivist mindset in online writing programs. She states that, "research into online writing instruction (OWI) contexts acknowledges the importance of community. Principle 11 of the Conference on College Composition and Communication's (CCCC) position statement on OWI links online communities with student success. Recent OWI scholarship has also explored the Col framework" [20, p. 16]. With the framework established, the author states that she is interested in creating a connectivist mentality and supporting a Col among learners in the MA Technical Communication program she now heads. The purpose of this mindset is to "help learners to build networks and to use those networks as an explicit and implicit learning strategy. Networking is an essential skill, regardless of whether learning takes place primarily online or on-campus" [20, p. 17]. Three stages are included in creating a peer-activity in which the learner takes precedence: 1) Development- strategies are planned and outlined, 2) Deployment- the instructor and student learn together on the peer activity, and 3) Evaluation- both parties are involved in evaluating and determining the improvement proves. The following section explains the two examples that follow the aforementioned organizational principle.

Example 1- Fostering Connectivism Through an Academic Workshop

- Development- The author consulted with various board members and institutional members and was granted approval to run the course in an online format. Strategies were developed and research was conducted that led her to conclude that "an intensive face-to-face socialization workshop was essential preparation for learners" [20, p. 18].
- Deployment- All students were required to attend a campus event in which enrollment, library tours, student counseling, and campus tours were conducted. The purpose of this event was to connect learners to the university and ensure that they were not forgotten within the college communal atmosphere. She additionally created a separate orientation for the online community in which the virtual learning environment is introduced, the program is discussed, communication

tools are established, and an overall sense of what to expect is discussed. "The workshop also, crucially, provides scope for learners to ask questions and to provide feedback. After the workshop, the whole group has lunch together" [20, p. 19].

- Evaluation- Feedback was given in the form of student comments and analyzing data from the virtual learning environment (VLE) site. Comments mentioned were "collaborations and friendships that began at the workshop and continued throughout the program, and most refer to the essential information they assembled regarding how to interact and access materials online" [20, p.19]. In terms of quantitative data, the site had over 2,000 visits in the 2018-2019 year with almost 100 messages and 1,500 views in the forums.

Through this immersive environment, the students were able to interact with their peers and develop learning communities to assist throughout their time at the university; both of which promote a connectivist setting.

Example 2- Developing a CoI Through a Peer Review Activity

- Development- The author, while teaching a course in which the students conduct a research proposal and write their findings, decided to use peer feedback as a way to promote working together to achieve a viable proposal. Some of the statements utilized were: The instructor helped keep the course participants on task in a way that helped me to learn, getting to know other course participants gave me a sense of belonging in the course, and the instructor helped keep the course participants on task in a way that helped me to learn. "This activity also exploits principles of connectivism, by enabling learner to recognize diverse opinions, to acknowledge one another as information sources, to acknowledge the peer group as a node that facilitates learning, and to see connection within and across peers' proposals" [20, p. 23].
- Deployment- The author then deployed peer-review guidelines in which the students were to engage with other students and list ways in which their proposal could be improved. Communication guidelines were also established, and constructive criticism was encouraged. At the end of the activity, the instructor, acting as the subject matter expert (SME), posted comments.
- Evaluation- In 2018, the author found that most graduate students enjoyed the activity while most groups posted more than the required number of messages and continued to use the forum to discuss their projects with their peers (thus fostering a CoI and connectivist mentality).

The author found that both activities utilized principles of connectivism and inquiry to develop learning within a group of students. Networks were also established in the socialization workshop that could lead to higher levels of course completion by enabling a learning environment. Learner engagement and satisfaction was addressed in the second example in the form of constructive feedback and peer-assessment groups. The author states that, "gathering feedback about interventions enables instructors to update activities and provides a solid basis for curricular improvements" [20, p. 27].

Lastly, Makokotlela [21], was interested in studying the use of an e-portfolio as an appropriate assessment strategy within a distance learning context. Due to higher education institutions integrating technology in teaching and learning, the author argues that using an e-portfolio "as an alternative method of assessment enhances pre-service teachers' technological pedagogy in an environmental education module" [21, p. 123]. Multiple definitions of an e-portfolio are distributed in the background of the article, yet the common theme that emerges is one of using multiple technological tools in which to provide instruction and/or assessment within the modern, digitized classroom. "Transformation in higher education in terms of the use of technologies in teaching and learning as well as assessment is a global trend, meaning that there should be a re-think in terms of preparing pre-service teachers' pedagogy" [21, p. 123]. The author uses Connectivism, in conjunction with the Mmogo theory (discussed later), as a lens in which to view the e-portfolio due to the theories' networking principles of connecting nodes and information resources.

The author issues three research questions that form the crux of her article:

- What is the significance of an e-portfolio as an alternative way of assessment in EE?

The author explains that due to the digital age in which teachers and students thrive, an e-portfolio provides an opportunity as an alternative assessment tool in which to present their knowledge consumption. This method could be used to evaluate their course or provide evidence of their learning (if used in the student context).

- How does the use of an e-portfolio as another method of assessment enhance pre-service teachers' digital pedagogy?

By engaging in the creation of an e-portfolio, the author argues that the teachers' technological competence is further enhanced as the process acts as a self-directed learning mechanism. Also, the skills needed to develop the portfolio bodes well when teaching online courses. "It has been highlighted by Van Wyk [22] that teachers must have a clear understanding of digital pedagogy due to technological changes in the teaching and learning environment. Changes in approaches to assessment cannot, therefore, be ignored because it is an integral part of teaching and learning" [21, p. 125].

- How does the use of an e-portfolio as an alternative assessment tool develop collaborative skills?

As it relates to the Mmogo theory (meaning "togetherness"), the creation of e-portfolios centers around a collaborative effort in that students share ideas and interact with one another throughout the process [21]. As it relates to a teachers' technological pedagogy, e-portfolios allow for collaboration that could persist beyond the implementation process. Simply put, the applied learning that is required "should be designed to encourage the desired interaction between the students both to enhance learning and develop collaborative skills" [21, p. 126].

The author is approaching her research with a connectivist mindset and utilizing many of the principles set forth in Siemens' foundational paper. I find it important to mention some of the outcomes the author experienced when exploring e-portfolios through the two aforementioned theories. In terms of success, the author found the following benefits were pertinent: 1) ICT skills were introduced as a secondary measure, 2) technological pedagogical content knowledge skills (TPCK) were developed, 3) collaborative skills improved, and 4) an assessment strategy was developed in that evidence-based and reflective practices were showcased. In terms of challenges, 1) low ICT skills could present problems, and 2) digital literacy cannot be presumed.

The purpose of the author's undertaking in this study was to explore how e-portfolios are used as an assessment tool in teachers' educational modules. The author used purposive sampling with 13 participants being the sample. Semi-structured interviews were conducted to determine their experience with e-portfolios, and telephone interviews were conducted. The author also performed document analysis by reviewing the e-portfolios created by the sample of students. Informed consent was obtained, and the data analysis was coded. Three themes emerged: 1) Significance of an e-portfolio, 2) technological competencies of preservice students, and 3) the development of collaborative skills. In total, 9 of the participants data was collected for a number of reasons. In terms of the three research questions asked, the author reported the following information:

- What is the significance of an e-portfolio as an alternative way of assessment in EE?

The author found that e-portfolios were a useful method in assessing the students' progress. The students were involved in an environmental education course in which they had to visit a recycling plant and digitally document their observations. The process of compiling an electronic assessment enhanced the students' technological prowess with one student stating that "an e-portfolio was important because some of us did not know anything about this kind of assessment. Now I know how to do electronic assessment" [21, p. 128].

- How does the use of an e-portfolio as another method of assessment enhance pre-service teachers' digital pedagogy?

The students were required to take photos of their visit to various recycling plants, imbed them within an e-portfolio text, as well as include the information in PowerPoint slides. One student stated that "After taking photos from the recycling plant, I learned to download and adjust photographs and even attach them in the portfolio. This will help me to effectively teach solutions to waste" [21, p. 129]. Additionally, students were exposed to the WhatsApp application to share their e-portfolio. This collaborative process created a community of inquiry in which the students agreed that they would continue using in the future. One limitation to the study was some students did not submit an e-portfolio which led to the belief that not all students were able to perform the necessary digital tasks.

- How does the use of an e-portfolio as an alternative assessment tool develop collaborative skills?

The author revealed that students were able to collaborate throughout the e-portfolio process which supported her earlier statements concerning the Mmogo theory of togetherness. Also, connectivist principles were employed as the primary source of the course assessment via an e-portfolio creation.

3 DISCUSSION

In providing a historical perspective as it relates to technological instruction, and by expanding on a learning theory in Connectivism that potentially provides a framework for our digital age, my hopes are to showcase a) our reliance on technology, and b) the possible avenues for educational institutions to apply said technology. So, what does the future of technological innovation have in store for learning and education? And what impact does this have on instructors? According to Rof et al. [23], “HEIs (higher-education institutions) are being forced to adapt to the ongoing cultural and societal changes challenging traditional educational practices, a central aspect of which is the rapid and continual development of digital technologies, some of which have been specifically developed for educational purposes” [23, p. 125]. As the author mentioned, the rapid changes that are being advanced could be causing many institutions to be overwhelmed in the decision-making process and causing a “freeze” type of effect in which they stick with what they have because it has worked so far. Bucata [24] makes an excellent observation when he states that “we have a society in which the conditions for generating knowledge and processing information have changed significantly due to a technological revolution focused on information processing, knowledge generation and information technologies” [24, p. 364]. This description seems fitting due to the nature of educational systems, namely, to educate and inspire a generation to be sustainable and successful. In doing so, do we need to focus on more personalized learning? More customized leaning paths in which technology assists in the learning process? Do we need student-led initiatives in which they choose the topics they are interested in? “Teachers, schools, districts, states, and technology developers endeavor to personalize learning experiences for students, but definitions of personalized learning (PL) vary, and designs often span multiple components. Variability in definition and implementation complicate the study of PL and the ways that designs can leverage student characteristics to reliably achieve targeted learning outcomes” [25, p. 1675].

Another avenue that seems to be becoming more popular is the use of learning analytics and machine learning to guide academic institutions in their decision-making process. At the institution where I currently work, we are an open-enrollment college that largely accepts any type of student. We require TSI testing or other forms of placement metrics that allow us to predict with a fair amount of accuracy which courses would serve as a starting point in the collegiate process and as a result, a large percentage of our student population is either first-generation and/or non-traditional. These students have a) never been enrolled in college, b) do not have parents or a support system that has attended college, and/or c) both. As you can imagine, this puts a lot of emphasis on early-alerts as it relates to attendance and grades. It’s not that the students are unable to grasp the course material, they just don’t know the minutia that’s involved within higher education (registration requirements, program requirements, GPA, scholarships, financial aid, syllabus responsibilities, etc.). According to Treca Stark [26], manager of the Technology Resource Center at Prince George’s Community College, “community colleges operate with limited financial and human resources while providing open access to higher education, and they maintain multiple missions related to both academic preparation and workforce development. These complexities contribute to institutional leaders’ motivation to explore how analytics can add value to community colleges” [26]. One idea, made popular by Austin Peay State University, would be analytics that recommended courses based on “students’ academic profiles and considers their course path with the past success of peers like them” [27 p. 4]. While I do not know if the costs of such a feature would be allowable at some institutions, analytics of this nature would greatly benefit many student populations.

4 CONCLUSION

I am all for technology guiding and molding our educational system to better serve the next generation of learners. However, I do not believe that technology should replace what is an integral part in the human growth process, and that is the role of the teacher acting as a mentor. I believe the teacher serves an indelible purpose in helping shape the lives of young people. These skills cannot be replicated by data analytics, and I would argue that these unsung traits are rarely, if ever, incorporated into performance reports. Let’s take what AI is telling us as it relates to learning analytics and filter it through the lens of our teachers’ experiences. In doing so, we potentially capture the best of both perspectives; human empathy and machine knowledge.

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