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Reimagine Your Course: Course Mapping, Backward Design, and Creation of an Engaged Online Classroom

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Abstract

This paper offers a framework for online instructors to redevelop courses through the utilization of methods and tools readily available and geared toward learning goal alignment. This approach combines course mapping, backward design, and online principles to ensure goals are met and results in active faculty reimagination of their courses. Techniques are shared through the lens of a classroom assessment course where students struggled with new concepts and methods. Often there is a struggle to comprehend principles due to a disconnect between stated outcomes and lack of alignment with required assignments. A deconstruction process through course mapping and a deliberate focus on learning goals as promoted in backward design are combined with online course creation protocols to share a successful redefinition that substantially improved engagement and success.

Introduction

Introduction

Typically, teacher candidates enter their first class on assessment prepared with individual past experiences as recipients of grades; but lacking in-depth exposure to theory and research of assessment. They struggle when required to analyze student learning or to consider data-driven instruction (Bambrick-Santoyo, 2010). How to prepare them for this task in a rigorous and meaningful way becomes more complicated when presented online (Crews & Wilkinson, 2015). This lack of preparation is often true, no matter the subject under study in online courses.

Upon taking over an established course, even if not new to teaching nor concepts to be taught, a faculty member can quickly realize a content-first approach is not sustainable. Instead, to draw upon backward design, online teaching principles, and successful experience in teaching as an art and science allows for a new approach to reimagine an entire course. The use of these processes requires alignment of learning goals first with assessments, then to assignments, and, finally, to instructional materials or content to ensure student success.

The challenge begins with the consideration of how to educate in rigorous and meaningful ways. In an assessment course, it meant an approach that addressed highly nuanced concepts and inherent difficulties within assessment itself and effective use of feedback (William, 2016). The approach resulted in acceptance that students would struggle with an analysis of student learning and with considerations involved in the use of analysis to inform instruction (Bambrick-Santoyo, 2010).

To counter such difficulties in instruction, an approach that halts teaching to the content with a thorough and strategic course mapping process mirrored after curricular mapping technique and deliberate focus on individual learning goals is instructive (Uchiyama & Radin, 2009). In this purposive approach,

course mapping, backward design, and online course creation standards merge to create logical, focused, and engaging courses.

Curricular Mapping

The re-imagination process of the online assessment course began with known techniques and benefits of curricular mapping. Mapping the curriculum identifies gaps that become especially apparent when detailed collaboratively to outline an entire program (Hutchings, 2016; Udelhofen, 2005). However, there remains a missing piece even if a program is adequately mapped. Often the process does not extend down to the individual course level. Therefore, faculty must determine how to bridge the gap in the curricular map and to identify how individual courses fit within the map (Arafeh, 2014).

After the intentional curricular mapping of all programs is complete, the planning is not final. Maps need to be periodically referred to and revised. This iterative process makes direct and actionable consideration of overall program-level curricular continuous improvement and development at the course-level come to light. Gaps or areas where items are overemphasized or perhaps emphasized at the wrong level are documented, and it becomes possible to correct misalignment (Kopera-Frye et al., 2008).

As Figure 1 shows, it is best to go directly to the curricular map when evaluating the stated program-level student learning outcomes. An investigation of where each outcome is introduced, emphasized, reinforced, or achieved in particular courses needs to occur to determine whether these points are accurate and appropriate before moving forward. In many cases, data reveal inaccuracies for a specific course, and this knowledge provides the first steps in consideration of course mapping.

Course Mapping and Backward Design

Faculty are, on occasion, guilty of becoming lost in an attempt to teach content when it better serves students to focus squarely on learning goals (Davidovitch, 2013). This is especially true when faculty take over teaching a course last minute or have a lack of pedagogical training (Michael & Libarkin, 2016). Therefore, that first semester an instructor may valiantly strive to teach the course as established, which they quickly realize will not work. It does not mean it is a bad course, per se. It may be unstructured, and this indicates it is appropriate for a conversation with others familiar with the course history and time for a course reset.

After a problematic course experience, it is time to go beyond the evaluation of the curricular map at the program-level. A course revision may require an adjustment to the map. At this point, analysis of precisely what the students ultimately must know and be able to do through active participation in the course, and what it will take to get them to the place where attainment of established goals is assured. The premise is that a course redesigned deliberately using available structures and tools that focus on student learning outcomes first, as outlined in a backward design approach (Wiggins & McTighe, 2005), results in an online environment that ties learning together for the student.

If this premise holds, once student learning outcomes become clear, the next step is a consideration of appropriate assessments tied directly to stated outcomes. After these two processes merge, necessary instructional materials must be aligned with assignments or activities, thus, again, further ensuring that goals are met. In other words, faculty must drill down from the curricular mapping concepts to envision a course mapping process at a highly detailed level. Reassessment of student learning outcomes for a course often leads to refreshed results.

A search for literature or examples on course mapping limited, but there are depth and breadth of research on backward design and online learning. Available research does not translate to the process of how to go about the task intuitively. As shown in Figure 2, the most challenging part of course mapping is aligning, step by step, student learning outcomes with assessments deemed best to address the outcomes. An additional difficulty is a thorough consideration of activities or assignments that might best fit stated assessments. When these two steps are fully aligned, the faculty can consider particular materials students need to achieve the desired outcomes. This is the essence of backward design. Determination of assessments derived from outcomes first; not planning lessons or decisions of content.

With a process developed and followed by the creation of a course map, a more in-depth and practical vision for application and use of class time, activities, and feedback results. Specific examples of integrated group assignments and other measurable activities illustrate how specific learning goals may help an overwhelmed or frustrated instructor visualize how alignment works and will help inform all online or face to face courses (Fink, 2013; Marchand & Gutierrez, 2012).

Effective and Engaging Online Courses

Faculty involved in the Maryland Online network shared some of the first published work on today's fundamentals of teaching online (Bourne & Moore, 2003) and offered early courses on how to teach online. Eventually, those early Maryland Online concepts would evolve into [Quality Matters™](#) (QM) (Shattuck, 2007). Once a course map is developed through the use of backward design, it is time to couple this process with mature online practices that overwhelmingly incorporate learning theory. This is the essence of quality instructional design theory (Reigeluth, 1999).

With the exponential growth of online college courses has come various, sometimes competing, sets of practices, and a variety of methods for review of such courses. Today, two of the most prominent models for the development of quality online courses are QM online design standards and Open SUNY COTE Quality Review Process and Rubric (QSCQR) (Baldwin, Ching, & Chang, 2018). Where the early days of online learning focused on protocols and less on innovation, today's research places far more emphasis on methods to fully and actively engage students and follow proven instructional design technique (Magda & Aslanian; 2018 & Means et al., 2009).

Multiple studies indicate how the presence and responsiveness of faculty directly lead to deeper engagement and emotional investment in the learning process. And in so doing, helping instructors better grasp a student's sense of connectedness or need for support in online classes (Marchand & Gutierrez, 2012; Martin et al., 2018). Therefore, spending time in consideration of how to incorporate relationships forged in face-to-face sections within a redesigned online version of a course automatically helps avoid the scenario where an online course lacks interaction or meaning and becomes reading and discussion-post dependent. Critical to success is seeking out how to incorporate and design as many iterative and interactive components as possible to create a more personal relationship of student to faculty, student to student, and even student to content (Bolliger & Inan, 2012; Palloff & Pratt, 2013).

One example incorporated in the assessment course under study that offered a more personalized approach was the creation of weekly introductory overview videos and one for each module of the course. Students were also required to utilize video technology. This approach became a simple interactive way for students and faculty to see one another and develop a sense of connectedness similar to the more natural conversations that often occur in an in-person setting. In this particular course, the first opportunity for students to "see" each other presented itself in the first week of class. Students were required to utilize a

simple commercial video platform to introduce themselves and to respond to one another by sharing concerns or attitudes towards a class on assessment. This became a low-stakes, non-graded requirement that allowed the faculty and students to engage with one another and to “see” and hear the faculty’s enthusiasm to support their successful efforts. As research suggests, this simple step allowed students to feel connected to both the course and each other from day one and established a sense of belonging throughout the semester (Bolliger & Inan, 2012; Jiang, 2017).

From this first inclusion of instructor and student video interaction, other proven online techniques found their way into the course. Multiple highly structured discussion boards became interactive conversations encouraged through the use of detailed rubrics, and a variety of carefully planned asynchronous group assignments lead to further engagement (Du & Xu, 2010; Fink, 2013).

Results

After completion of a detailed course map that linked all student learning outcomes with appropriate assessments, it becomes much easier to determine the best instructional learning opportunities and materials for a course. The result of relying upon research-based online practices with a focus on the interaction of student to student, student to faculty, and student to content, translates into real and measurable engagement. After teaching the updated version of the assessment course, it was evident there was less confusion, substantially more interaction, and that learning took place. The further unanticipated benefit of students fully engaged well beyond basic requirements was a pleasant surprise.

In just one section of the assessment course with 19 enrolled, the student introductory videos had 204 views with 4.7 hours of engagement. An additional video assignment late in the semester that required students to share new knowledge regarding a singular aspect of assessment had a staggering 458 views and 11.1 hours of engagement. In this instance, students were only required to view one 90 second video and respond to one person.

Other indicators of full engagement with course materials were drawn from analytics available through the LMS. This included the number of logins to the course site and the number of views on provided materials and videos. These numbers were equally as substantial as views of one another’s video posts and instructor videos. The total number of site visits in this section for individual students ranged from just over 100 to 352, with a top range of 21 hours spent within the course shell alone.

In the creation of discussion board rubrics, each had at least five criteria (ideas and analysis, connection to course material, contribution to the learning community, writing quality, and required postings/timeliness). All rubrics also included four levels (exemplary, accomplished, developing, and unsatisfactory/beginning). Further, students had to first make their posts before being able to read other's posts.

In the first assigned discussion, students quickly realized all entries were thoroughly read for content and context. For these students, the rubric became the best gauge when striving to express original thought, actively participate, and achieve a quality grade. Multiple students indicated that, before this course, they never believed their instructors read their postings for quality and that the work often felt like a task to check off a list. Once they figured out the approach within this course was different, they developed an appreciation for the standards and postings not only grew in quality and quantity, but students also began to ask one another further questions and to rely upon one another for insight often far exceeding required

postings. This finding was even more profound in the two required group-related assignments. These postings were double the average for other discussions and far above any requirements set forth.

End of the semester, final reflective discussions bear out these results went beyond numbers. For example, comments in the reflective discussions such as, “thank you for that idea, that never occurred to me” or “what do the rest of you think about” with a clear expectation that classmates would respond to their queries were commonplace. One particular student shared with another, “I’m so proud of you being able to make it through, I agree with you that in the beginning, we were all very overwhelmed and that everything was confusing, but I am so happy for you and me that we made the connections and that finally ‘click’ everything started to make sense.” Another stated, “I am very thankful for my classmates who were always willing to lend a helping hand when trying to figure out or navigate assignments.” And, finally, one student summed up the experience the best when he stated, “as we have progressed through this course, I find myself very proud of the progress that has taken place. There has been an in-depth group discussion that will forever stick with me throughout my teaching career.”

Conclusion

Full online redesign presents multiple ways to set aside assumptions and to reshape a course. Further, incorporation and utilization of known practices (Crews & Wilkinson, 2015) as derived from such standards as QSCQR and QM, course mapping, and backward design help reimagine and redesign online courses. The redesign for this assessment course went through both institutional review and QM external review. It became QM certified with no areas for improvement cited in 2019. An interesting unintended consequence of the work to reimagine one course was the realization of how many online learning practices filtered into the face to face course. This is the inverse of what often happens wherein what works in the face to face course is often inserted directly into an online version. The later does not translate well. However, taking proven online components and incorporating those into the face to face class does work and can improve the ability to teach both versions.

Sharing the process of course mapping through one specific course-level redesign, and how this action improved interaction, reinforces the potential to see deeper intellectual connections made, improved student learning, expanded engagement, and improved student’s sense of success. As a result of the course mapping process undertaken, utilization of backward design principles, and those identified online practices lead to substantive change and improved student learning. Faculty are encouraged to consider actions that empower them to go beyond the current practice of teaching to the content to consideration of course-related changes based on detailed course mapping. The process improves student learning and allows for exploration into ways to inform current methods or models of online instruction. It places the focus directly on student learning outcomes and student improvement. It also moves faculty away from past experiences of content-focused lessons to measurable active change and engagement.

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Figures

Figure 1

Sample of a Partial Curriculum Map – Student Learning Outcomes

4. Curriculum Map – Student Learning Outcomes				
Program-Level SLO	Course(s) Providing Formative Assessment			Course(s) Providing Summative Assessment
	SLO is introduced	SLO is emphasized	SLO is reinforced	SLO is achieved
Upon graduation, students will be able to:				
SLO 11: analyze evidence of student learning in content-specific skills, concepts, strategies, and/or processes.	EDUC 4270 EDUC 5530	RDG 4020 EDUC 5501	RDG 5362	EDUC 4410 EDUC 4510 EDUC 4950 EDUC 5410 EDUC 5510
SLO 12: provide feedback to focus students that addresses their strengths and needs.	EDUC 5500	EDUC 4270 EDUC 5530	RDG 5362 EDUC 4270	EDUC 4270 EDUC 4510 EDUC 4950 EDUC 5410 EDUC 5510 EDUC 5940
SLO 13: provide opportunities for students to use feedback to guide their further learning.	EDUC 5530	RDG 4020 EDUC 4270	RDG 5362 EDUC 4270	EDUC 4270 EDUC 4510 EDUC 4950 EDUC 5410 EDUC 5510
SLO 14: analyze students' use of language to develop content understanding.	EDUC 3070 EDUC 4270		RDG 5362	EDUC 4410 EDUC 4510 EDUC 4950 EDUC 5410 EDUC 5510
SLO 15: use the analysis of what students know and are able to do to plan next steps in instruction.	EDUC 4270 EDUC 5360	RDG 4020	RDG 5362 EDUC 4270	EDUC 4270 EDUC 4510 EDUC 4950 EDUC 5410 EDUC 5510

Figure 2

How to Develop a Course Map

Learning Module (TOPICS)	Objectives (SLO Alignment)	Learning Materials Necessary to Accomplish SLOs/MLOs	Activities (Learning Experiences)	Assessment:
<i>What is the specific topic to be covered?</i>	<i>What will students be able to do or know at the end of the topic or segment of instruction?</i>	<i>What materials (e.g., textbook chapters, PowerPoints, handouts, etc.) will contribute to student learning? What do they need (in or out of class)?</i>	<i>What learning experiences (e.g., assignments, in-class activities, homework, lectures, etc.) will contribute to student learning?</i>	<i>What will you use to assess the learning outcome? What will the students do to show they know or can do?</i>

What is the overall topic/s?	What are the student learning outcomes for this topic/s? Number them and align them to the course SLOs.	What materials will the students need to meet those student learning outcomes? Such as: Any textbook reading or other reading? Are there PowerPoints or other presentation materials? Are there any handouts they will need? Rubrics?	What specific learning experiences or activities will they participate in to meet those outcomes? Will they watch a video? Participate in a discussion? Read something? Do some sort of group work?	How/what will you assess? Perhaps there is a paper with a rubric? Is there a particular assignment to turn in/do for a grade? A formative assessment?
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*It is helpful to faculty (and to students) if numbered and aligned in each part of the process.

Atlas case study and discussion	1. Evaluate and analyze the assigned case study (SLO6) 2. Participate in a group assigned discussion (SLO1, 6 & 7)	What is the edTPA Prezi [SLO6, LM2.1] Individual email invitation for link to Atlas at https://atlas.nbpts.org/login?next=%2F [SLO6, LM2.1] Assigned case study group list [SLO1, 6 & 7, LM2.1 & 2.2] Group assignment discussion area in D2L [SLO1, 6 & 7, LM2.1 & 2.2] Discussion rubric for case study [SLO1, 6 & 7, LM2.1 & 2.2]	1. View the “what is the edTPA Prezi [SLO6, LM2.1] 2. Watch video, evaluate, and read commentary [SLO6, LM2.1] 3. Participate in the assigned “case study” discussion [SLO1, 6 & 7, LM2.1 & 2.2]	1. Group discussion rubric [SLO1, 6 & 7, LM2.1 & 2.2]
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Higher Education Faculty Use and Self-efficacy of mLearning Devices: Findings from a Case Study

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Introduction

In January 2015, 66% of American adults owned a smartphone, 42% owned a tablet computer, and sixty-three percent of those owning smartphones reported using them for Internet access (Mobile Technology Fact Sheet, 2015). By November 2016, the percentage of Americans owning smartphones had increased to 77% (Smith, 2017). Taylor et al. (2011) found that 57% of college graduates use smartphones, tablets, or laptop computers, while 87% of college presidents reported using smartphones daily. In a university case study, Hanley (2013) found that 74% of the students owned smartphones, 98% used them for internet access, and three of ten also owned tablets. Clearly, mobile learning (mLearning) has become an integral part of our daily lives.

Interestingly, mLearning has been defined from multiple perspectives. Keegan (2005) defined mobile learning as “the provision of education and training on smartphones and mobile phones” (p. 3), while Crompton (2013) defined mLearning as “learning across multiple contexts, through social and content interactions, using personal electronic devices” (p. 357). Similarly, El-Hussein and Cronje (2010) defined mobile learning as “any type of learning that takes place in learning environments and spaces that take account of the mobility of technology, mobility of learners, and mobility of learning” (p. 20).

Most of the available literature on mLearning focuses on P-12 student use and self-efficacy of mLearning devices. There are pilot programs in universities that give students access to individual mLearning devices, typically iPads (Murphy, 2011), and some research has been conducted on the usage of mLearning devices by college-level students (Geist, 2011; Miller, 2012; Murphy, 2011). The available literature on higher education faculty use and self-efficacy for using mLearning devices is sparse (Souleles et al., 2015).

Harris Interactive (2013) surveyed 1,206 college students in 2013 and found 80% of these students felt tablets could change the way material is presented in a course, 60% expected tablets to increase student performance, and 40% of the students surveyed reported using tablets in academic settings. College students tend to show interest in using mLearning devices in the classroom (Rogers2010), and student attitudes toward using mLearning devices in the classroom tend to be positive (Cavus & Uzunboylu, 2009; Jacob & Isaac, 2007; Uzunboylu et al., 2009). Dahlstrom, Brooks, and Bichsel (2014) surveyed students in 213 colleges and universities in the United States and 15 other countries. Smartphones were owned by 86% of the students, and 47% of the students owned tablets. More than half (59%) of these smartphone

owners used their smartphone for education-related purposes during class meetings, and among tablet owners, 31% used tablets in class for instructional purposes. Students also tend to have a high self-efficacy toward mLearning (Kenny et al., 2010) and would like to see instructors incorporate more mLearning into the classroom (Mahat et al., 2012).

Self-efficacy is defined as “[p]eople’s judgments of their capabilities to organize and execute courses of action required to attain designated types of performances” (Bandura, 1986, p. 391). Self-efficacy also “...encapsulates the way that faculty members see themselves as teachers, researchers, and academic citizens as well as their beliefs about whether they can successfully complete tasks in each of these areas” (Major & Dolly, 2003, p. 91). Previous studies found a positive relationship between computer self-efficacy and the use of technology (Agarwal & Karahanna, 2000; Fagan & Neill, 2004).

The extensive and increasing usage of mLearning devices by students notwithstanding, faculty members have not overwhelmingly embraced the use of mLearning technology in an academic context. Dahlstrom and Brooks (2014) surveyed 17,452 faculty members and found 78% were interested in incorporating technology into their pedagogy despite 51% who ban smartphones during class and 18% who ban tablets from class. Thirty percent of the faculty reported creating assignments that required the use of a mLearning device. The same study also found almost half (47%) of the students and two-thirds of the faculty found smartphones/tablets to be distracting during course time.

Purpose of the Study

The available literature on faculty use and self-efficacy levels of mLearning devices is sparse at best. Chen and Denoyelles (2013) concentrated on undergraduate academic usage of handheld devices in central Florida, but faculty usage was not studied. Perkins and Saltsman (2010) studied iPhone and iPod use with students and faculty but did not research self-efficacy levels. More research is needed concerning mLearning device usage in higher education for instructional and professional activities (Chen & deNoyelles, 2013; Marrs, 2013; Ngyuen, Barton, & Nguyen, 2015; Park, Nam, & Cha, 2012; Perkins & Saltsman 2010). This mixed-methods study provides initial assessments of levels of use of mLearning devices for professional activities and the self-efficacy of faculty members for using these devices. Differences in self-efficacy and use levels, based on selected demographic and attribute variables (age, sex, years of experience, and level taught), and significant challenges to faculty use of mLearning devices are also provided.

The following specific research questions guided the study:

1. What are faculty members’ level of use of mLearning devices for professional activities?
2. What are faculty members’ levels of self-efficacy for using mLearning devices for professional activities?
3. What are the differences, if any, in levels of faculty members’ use and self-efficacy for using mLearning devices for professional activities based on selected demographics/attribute variables (age, sex, level taught, and teaching experience)?
4. What is the relationship, if any, between faculty levels of use and self-efficacy for using mLearning devices for professional activities?
5. What are the biggest challenges facing faculty members in using mLearning devices?

Research Design and Data Collection

The study employed a mixed methods case study design. Dependent variables were levels of faculty use and self-efficacy for using mLearning devices. Independent variables included age, sex, years of teaching experience, and level taught (undergraduate, graduate, or both). The study population consisted of all full-time faculty members (N = 1,067) at one regional public university in the Southeast United States. Data were collected in the 2016-2017 academic year.

Two instruments were developed for use in the study. The *Faculty mLearning Device Survey* is a two-part, three-page, self-report survey. Part A of the instrument solicits participant demographic and attribute data. Part B consists of 34 questions, the first 17 relate to the frequency of use of mLearning devices for a particular professional activity, and the second 17 refer to the self-efficacy level of faculty related to using mLearning devices for these same 17 professional activities. Part C is an open-ended question requesting respondents to identify any barriers faced in using mLearning devices for professional activities. The second instrument, an interview protocol, *Faculty mLearning Interview Protocol*, was used to validate information gathered through the survey as well as collect additional information to explore the uses and challenges of using mLearning devices for professional activities. The interview protocol prompts are aligned with specific research questions. A panel of experts was used to validate both instruments.

The survey instrument was administered to faculty members (N = 1,067) using the university email list. Overall, 142 surveys were returned. Of the 140 usable surveys, 107 respondents answered the open-ended question. Twenty-one respondents agreed to be contacted for a follow-up interview. Eleven of these 21 faculty members were interviewed.

Findings

Thirty-seven percent (n = 52) of the respondents were male and 62.6% (n = 87) were female. Six respondents (4.3%) were 30 or younger, 22.1% (n = 31) were 31-40 years of age, 22.1% (n = 31) were 41-50 years of age, 31.4% (n = 44) were 51-60 years of age, and 20.0% (n = 28) were 61 years of age or older. Thirty-two (22.9%) respondents taught undergraduate courses only, 47.1% (n = 66) taught graduate courses only, and 30.0% (n = 42) taught both undergraduate and graduate courses. Forty-four (31.4%) had five years or less of higher education faculty experience, 15.7% (n = 22) had 6-10 years of experience, 22.1% (n = 31) had 11-15 years of experience, 12.1% (n = 17) had 16 - 20 years of experience, and 18.6% (n = 26) had more than 20 years of higher education experience. Sixty-one (56.4%) respondents reported teaching face-to-face courses only, 12 (8.6%) taught online courses, eight (5.7%) taught hybrid courses, 16 (11.4%) taught face-to-face and online courses, 17 (12.1%) taught face-to-face and hybrid courses, eight (5.7%) taught online and hybrid courses, and 15 (10.7%) taught face-to-face, online, and hybrid courses.

Levels of Use of mLearning Devices

Respondents were asked to identify the types of mLearning devices they used for professional activities. Twenty-six (18.6%) used smartphones, 7.1% (n = 10) used tablets, 34.3% (n=48) used smartphones and tablets, and 50.0% (n = 7) used smartphones, tablets, and e-readers. No other combinations of smartphone, tablet, and e-reader use were reported.

Twenty-two (15.7%) respondents indicated they did not use mLearning devices for any professional activities. Of those reporting the use of mLearning devices for professional activities, the percentage response for specific professional activities for not using mLearning devices ranged from a low of 7.9% for email to colleagues to a high of 26.4% for having students access Internet apps for in-class activities, discussions, presentations, etc. Four professional activities produced do not use scores of 10% or less, seven had do not use scores between 10.1% and 19.3%, and six had scores of 20.0% or greater. (See Table 1)

Interview findings regarding mLearning device use were consistent with the survey data. When asked how they used mLearning devices professionally outside of the classroom, seven of the 11 interviewees discussed checking email or communicating with students, and other faculty members and four mentioned checking their courses with mLearning devices. When asked how they used mLearning devices in the classroom, four respondents indicated they used mLearning devices for using apps, and three respondents indicated they have students access Blackboard course material for use in the face-to-face classroom.

Respondents who reported they used mLearning devices for professional activities were asked their level of use for mLearning devices for the 17 professional activities using a five-point Likert scale (1 = Very Rarely, 2 = Rarely, 3 = Sometimes, 4 = Frequently, 5 = Almost Always). The mean level of use scores for the 17 professional activities ranged from $M = 3.35$ for creating audio/video to $M = 4.35$ for an email to colleagues. Sample means for all activities were statistically significantly different from the mean ($M = 3.0$) of a hypothetical normal distribution ($p < .05$) (See Table 2).

A one-way analysis of variance (ANOVA) test found mean level of use scores for research consumption between age groups of 40 and younger ($M = 3.87$, $SD = 1.10$), 41–50 ($M = 4.18$, $SD = 1.01$), 51–60 ($M = 4.33$, $SD = .646$), and 61 and older ($M = 3.54$, $SD = 1.03$) to be statistically significant at $p < .05$. There were no significant differences in the mean level of use scores for any of the 17 professional activities based on sex, years of experience, or level of courses taught.

Levels of Self-efficacy for using mLearning Devices for Professional Activities.

Respondents were asked to indicate their self-efficacy level for using mLearning devices for the 17 professional activities, using a five-point Likert scale (1 = Limited, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Exceptional). The mean self-efficacy scores of the 17 professional activities ranged from $M = 4.30$ for email to students to $M = 2.82$ for accessing Internet apps. A one-sample t-test found that all seven mean scores of 3.26 or greater were statistically significantly different from the comparison mean ($M = 3.0$) of the hypothetical normal distribution at $p < .05$. (See Table 3).

The 17 professional activity mean scores were analyzed to determine if there were differences in self-efficacy mean scores based on selected demographic and attribute variables. Independent samples t-test and one-way ANOVA results indicated there were no significant differences in the self-efficacy levels for the 17 professional activities based on sex, years of experience, and levels (undergraduate, graduate, or both) taught. Significant differences based on age were found for one professional activity, research consumption.

Relationship between Levels of Use and Self-efficacy

Spearman's correlation was applied to describe the relationship between the levels of use and self-efficacy for each of the 17 professional activities. Correlations ranged from .016 to .670. A significant positive correlation was found in the relationship between levels of use and self-efficacy for 15 of the 17 professional activities. Large correlations ($r \geq .50$) between levels of use and self-efficacy were found with social media, providing feedback, using Internet resources, using Internet apps, creating audio/video, having students use Internet resources, having students use Internet apps, calendar/scheduling, creating research, meetings, and updating course materials. Medium correlations ($r \geq .30$ to $r \geq .49$) between levels of use and self-efficacy were found with sending email to colleagues, consuming research, and service committee work. Statistically significant correlations were found in the relationship between email to students, email to colleagues, social media, accessing Internet resources, accessing Internet apps, creating audio/video, providing feedback, having students access Internet resources, having students access Internet apps, calendar/scheduling, research consumption, research creation, service committee work, meetings, and updating course materials.

Challenges in Using mLearning Devices

One open-ended question in the Faculty mLearning Device Survey asked respondents to list the challenges they faced in using mLearning devices for professional activities. One hundred five responses were provided. Eleven respondents identified the small screen size of mLearning devices and nine respondents noted the reliability of the connection as challenges. Respondents also indicated the incompatibility of mLearning devices with the LMS, a lack of time to learn about using mLearning devices, using the on-screen keyboard, and that mLearning devices did not work as well as computers as challenges in using mLearning devices. Interview findings indicated the most significant obstacles to using mLearning devices reported by faculty were connectivity issues and reliability of the technology.

Conclusions, Discussion, and Recommendations

The data collected for this study provided sufficient evidence to support the following conclusions.

Levels of Use

Overall, faculty reported mLearning device use levels of Sometimes – Almost Always with 14 of the 17 professional activity mean scores falling in the 3.50 – 4.35 range (on a five-point Likert scale). Significant differences were found between the obtained sample mean levels of use scores for all 17 of the professional activities when compared to the mean of a hypothetical normal distribution. Overall, age, sex, level taught and years of teaching experience do not appear to influence levels of use of mLearning devices for the selected professional activities.

Levels of Self-efficacy

Overall, faculty reported self-efficacy scores ranging from 2.82 for using Internet apps to 4.30 (on a five-point Likert scale). Participants rated their self-efficacy levels from Good to Exceptional for 13 of the 17 professional activities. Significant differences were found between the mean self-efficacy level scores for seven professional activities when compared to the mean of a hypothetical normal distribution. Overall, age, sex, level taught and years of teaching experience do not appear to influence self-efficacy levels of mLearning devices for selected professional activities.

Relationship between Use and Self-efficacy

Overall, there are medium to large positive correlations between levels of use and self-efficacy of mLearning devices for 16 of the 17 selected professional activities. Fifteen of the 17 correlations coefficients were statistically significant.

Challenges

Findings from the survey suggested the biggest challenges facing faculty members in using mLearning devices for professional activities were the small screen sizes of mLearning devices, the reliability of connections, incompatibility with the LMS, lack of time to learn how to use mLearning devices, the on-screen keyboard, preference for using a computer, lack of training, and keeping up with technological advances. Findings from the interviews suggested the biggest challenges facing faculty members were two challenges noted in the survey findings: reliability of the connection and a lack of training.

Discussion

Overall, the faculty members who use mLearning devices tend to use the devices for consumption, rather than creation (Cochrane, 2010). Faculty members also have more self-efficacy to use mLearning devices for consumption-related activities, rather than creation activities. This may be due to the challenges of the mLearning devices as creation devices. In the classroom, faculty members tend to use mLearning devices for repackaging existing knowledge, a study finding also supported by the findings of Buckley and Du Toit's (2010) in their study of 54 management faculty members.

Faculty members also tend to use mLearning devices for communication. Sending email to students, and sending email to colleagues were the professional activities in which mLearning devices were reported to be used most frequently in this study. This finding is supported by findings from Sahin and Thompson's (2006) study, in which 117 faculty members were asked if they used technology for instructional purposes. The results of the current study are also consistent with Groves and Zemel's (2000) findings related to faculty technology use. Of 41 faculty members and 23 graduate teaching assistants, 86% rated their knowledge of using email as good to expert.

In the current study, activities involving the creation of audio/video, research creation, having students use Internet apps, and using Internet apps were the professional activities in which mLearning devices were used least often. This result is consistent with the conclusions reached by Santilli and Beck (2005), who found 47 graduate faculty members who used educational technologies in the classroom reported communication with students as being the most-often used technology.

In the current study, nine of ten (91.4%) faculty reported using mLearning devices to text colleagues, but only 25% reported using mLearning devices to text students. As the procedure is the same for either professional activity, it can be argued faculty were not comfortable with students having access to faculty's personal cellphones. Faculty seemed more comfortable with students having access to faculty email addresses; 91.4% of faculty used mLearning devices to email students, and 92.1% of faculty used mLearning devices to email colleagues.

Consistent with findings from the current study, Spotts et al. (1997) surveyed 367 faculty and found no significant differences between male and female faculty members regarding instructional technology use. Sending email to students and to colleagues were the professional activities in which faculty members had the most self-efficacy in using mLearning devices in this study. This finding is consistent with the findings of Sabin and Thompson (2006) in which the mean self-efficacy score for using email for 177 faculty members was $M = 3.7$ on a 5.0 Likert scale.

Although not statistically significant, faculty members reported the lowest self-efficacy levels in using mLearning devices for creating audio/video, and accessing Internet apps in this study. This result supports the conclusions reached by Groves and Zemel (2000) who reported 21% of faculty members and graduate teaching assistants viewed their knowledge of using computer-aided instruction as good to expert. Although not statistically significant, the faculty self-efficacy levels for sending email to students, sending email to colleagues, providing feedback, using Internet apps, having students use Internet resources, calendar/scheduling, service committee work, and updating course materials increased between less than five years' experience, 6-10 years of experience, 11-15 years of experience, and 16-20 years of experience before decreasing for faculty with more than 20 years of experience. These results support Klassen and Chiu's (2010) study finding that the self-efficacy of teachers increased through 23 years of experience, then began to decline as experience increased. These findings also support the results of Myers, et al. (2004) who found faculty members with more than 10 years' experience teaching were less likely to use online learning environments than those with less than two years' experience.

Statistically significant medium to large positive correlation coefficients between faculty mLearning device use and self-efficacy levels were found for 15 of the professional activities. These results are consistent with the findings of Sahin and Thompson (2006), who indicated a high, positive correlation between use and self-efficacy concerning the use of technology for instructional purposes with 117 full-time College of Education faculty members.

Eleven respondents of the current study stated the small screen size of mLearning devices was a challenge for using mLearning devices for professional activities, which is consistent with the findings of

Maniar et al. (2008), who found students had a lower overall opinion of the small screen size of mLearning devices using a pilot study of 15 students. Respondents of the current study also felt the reliability of the connection was a challenge. This finding supports the work of Butler and Sellbom (2002) who indicated reliability was the most cited issue mentioned by 125 faculty members in the College of Sciences and Humanities at Ball State University.

Respondents of the current study stated a lack of training on how to use mLearning devices was a challenge. Interview findings suggested faculty members from different academic departments had different training needs. Some wanted basic training in using mLearning devices, while others, more comfortable with the technology, felt more advanced training would benefit that particular department. Respondents also noted keeping up with technological advances as a challenge, and that the on-screen keyboard and small screen size may hinder the adoption of mLearning devices for creative activities. If the Internet connection is unreliable, faculty members may have more trust in using teaching methods that do not involve Internet-connected technology.

Implications for Future Research

The study population consisted of full-time faculty at one university. Additional research could focus on broadening the population to include adjunct faculty. Research could also focus on expanding the population to include faculty at multiple institutions. The role of prior experience should be studied to determine if a correlation exists with the use of mLearning devices in higher education.

The survey instrument measured the levels of use and levels of self-efficacy for mLearning devices. Future studies may want to explore the motivation of faculty members to use mLearning devices. The use of mLearning devices in online courses and programs should be studied. Studying computer anxiety may provide further insight into self-efficacy levels. Additional studies should be conducted in the area of professional development related to the use of mLearning devices for professional activities to determine the areas of weakness. Other studies should examine factors that contribute to the use of mLearning devices for professional activities.

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Table 1

Responses of “Do Not Use mLearning Devices” for Professional Activities

Professional Activity	n*	%
Students Internet apps	37	26.4
Service committee work	35	25.0
Social media	35	25.0
Text messages to students	35	25.0
Research creation	33	23.6
Creating audio/video	32	22.9
Access Internet apps	27	19.3
Providing feedback	27	19.3
Course materials	19	13.6
Meetings	19	13.6
Access Internet resources	15	10.7
Calendar/scheduling	15	10.7
Students – Internet resources	15	10.7
Research consumption	13	9.3
Email to students	12	8.6
Text messages to colleagues	12	8.6
Email to colleagues	11	7.9

Note: N = 140. N* = duplicated count

Table 2

Use of mLearning Devices for Professional Activities

Professional Activity	n	m	SD	t-value
Text messages students	81	4.17	.91	11.66*
Text messages to colleagues	104	4.19	.89	13.62*
Email to students	105	4.34	.79	17.32*
Email to colleagues	105	4.35	.78	17.67*
Social media	79	3.71	1.20	5.25*
Providing feedback	89	3.89	1.10	7.67*
Access Internet resources	101	3.88	1.00	8.83*
Access Internet apps	88	3.38	1.33	2.64*
Creating audio/video	84	3.35	1.34	2.36*
Students – Internet resources	100	3.89	1.07	8.30*

Students Internet apps	78	3.44	1.24	3.10*
Calendar/scheduling	99	3.90	1.20	7.51*
Research consumption	104	4.00	.98	10.46*
Research creation	82	3.55	1.23	4.04*
Service committee work	79	3.75	1.07	6.22*
Meetings	96	3.90	1.01	8.69*
Course materials	94	3.66	1.17	5.47*

Note: $N = 140$. * $p \leq .05$. Scale: 1 = Very Rarely. 2 = Rarely. 3 = Sometimes. 4 = Frequently. 5 = Almost Always

Table 3

Self-efficacy Level of Using mLearning Devices for Professional Activities

Professional Activity	N	m	SD	t-value
Texts/ students	75	3.05	1.22	.706
Texts/colleagues	75	3.05	1.22	.706
Email to students	108	4.14	.89	.000*
Email to colleagues	110	4.30	.73	.000*
Social media	67	3.24	1.40	.169
Providing feedback	84	3.26	1.23	.055
Internet resources	101	3.41	1.12	.000*
Internet apps	77	2.82	1.14	.167
Creating audio/video	78	2.88	1.34	.449
Students resources	100	3.46	1.04	.000*
Students apps	72	2.92	1.22	.564
Calendar/scheduling	102	3.93	1.13	.000*
Research consumed	103	3.52	1.18	.000*
Research creation	80	2.99	1.37	.935
Service committee work	75	3.07	1.03	.577
Meetings	96	3.26	1.24	.043*
Course materials	95	3.17	1.33	.222

Note: $N = 140$. * $p \leq .05$. Scale: 1 = Limited. 2 = Fair. 3 = Good. 4 = Very Good. 5 = Exceptional

Understanding TPACK: Pre-Service Teachers and Technology Integration

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Introduction

The infusion of technology in instruction is a continuing challenge for teacher educators in the preparation of the next generation of teachers. The rapid changes in technology, software, and peripherals are additional concerns combined with tight budgets, limited professional development opportunities, and constraints of both student and faculty time. One approach to lessen these concerns and constraints may be to implement a single framework such as TPACK across a teacher education program. TPACK identifies three primary areas that include Technological, Pedagogical, and Content Knowledge.

The goal of teacher education preparation programs is to prepare future teachers who will be able to successfully demonstrate knowledge of content, skills, and pedagogical practices for the diverse students in their classrooms. When planning lessons, teachers need to include differentiated instructional strategies as well as integration of technology to improve student learning. For this reason, teacher educators must prepare PSTs to use digital technology tools in educational and purposeful ways. Tondeur et al. (2012) indicated it is about “the quantity and quality of pre-service technology experiences included in their teacher education programmes” (p.134). Tondeur et al. (2017) later added, “Technology needs to be infused as a systemic and systematic process throughout the entire teacher training programme” (p. 54).

As university teacher educators, we have found that most of the pre-service teachers (PSTs) in our classes are comfortable using online technology and applications for various purposes in their lives including social media, games, word processing, shopping, and researching answers to questions. Even though being connected to the internet is a constant for many, it is a whole new perspective when it comes to teaching PSTs how to integrate technology into lesson plans for students in schools. Many times, unless this is an area of expertise, both teacher educators and PSTs feel a sense of desperation to match learning

goals to the available and ever-changing technology programs, tools, or apps. With technology constantly transforming, this involves teaching PSTs how to teach content while also learning about the new forms of technology (Mouza et al., 2014).

Purpose, Rationale, and Research Questions

The purpose of this qualitative study was to examine a small group of PSTs' self-reported skills in understanding and applying the TPACK before student teaching. This study was conducted in a Midwestern university teacher education program. The rationale was to identify and document the intersections of knowledge that are required for strengthening PSTs technology integration preparation. Understanding technology and its applications for the classroom are essential components of teacher preparation. The data gained from this study will inform the researchers of the PSTs understanding of TPACK's three primary forms of knowledge which include technology knowledge (TK), content knowledge (CK), pedagogical knowledge (PK), and the integration of content and pedagogy knowledge with technology. It is the intersection of content, pedagogy, and technology that make up the secondary forms of knowledge intersections which are pedagogical content knowledge (PCK), technological content knowledge (TCK), and technological pedagogical knowledge (TPK). PSTs need to understand the interplay between the primary and secondary forms of knowledge to help them integrate technology in their future classroom practices. The research questions that guided this study were:

1. What are PSTs understanding of the three primary forms knowledge in the TPACK framework?
2. What are PSTs understanding of the intersections of Pedagogical Content Knowledge, Technological Content Knowledge, and Technological Pedagogical Knowledge?
3. What are PSTs teachers understanding of the interactions within all the domains of the TPACK model?

Literature Review

Technology Integration for Student Learning

The National Education Technology Plan Update (2017), discussed how “teacher education graduates feel unprepared to use technology to support student learning as they transition to teaching and using technology effectively in the classroom” (p.8). For this reason, a priority goal for all teacher education preparation programs should be for PSTs to learn how to use technology to support student learning and how to stay current with new apps and tools. According to the Advancing Technology in Teacher Preparation Policy Brief (2016) the U.S. Department of Education's Office of Educational Technology worked to develop four guiding principles for the use of technology in teacher education preparation programs. These include:

1. Focus on the active use of technology to enable learning and teaching through creation, production, and problem-solving.
2. Build sustainable, program-wide systems of professional learning and teaching for higher education instructors to strengthen and continually refresh their capacity to use technological tools to enable transformative learning and teaching.
3. Ensure PSTs experiences with educational technology are program-deep and program-wide, rather than one-off courses separate from their methods courses.
4. Align efforts with research-based standards, frameworks, and credentials recognized across the field (“Advancing Educational Technology,” p.9).
- 5.

Application of the TPACK Framework

Mishra & Koehler (2006) described how teachers need to make connections with teacher knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK). TPACK also includes the interactions

along with four additional knowledge domains, including pedagogical content knowledge (PCK), technological pedagogical knowledge (TPK), and technological content knowledge (TCK).

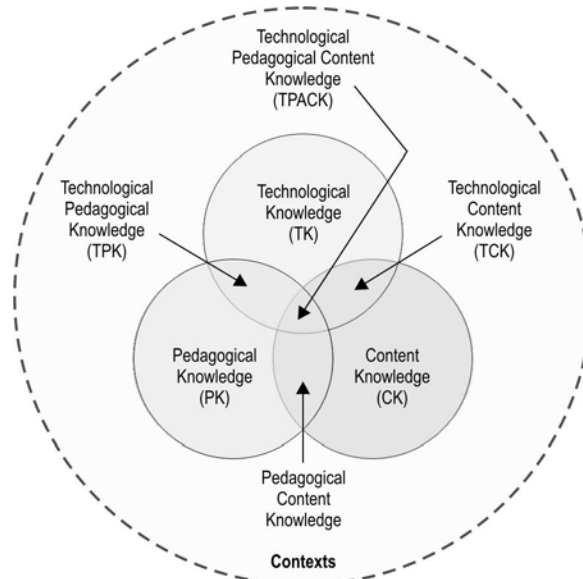


Figure 1: TPACK

Koehler et al. (2014) stated: "the most widely used pathway to TPACK development in teacher education settings is participation in a stand-alone educational technology course, with the aim of supporting PSTs transition from TPK to TPACK" (p. 101). Nelson, Voithofer, Cheng (2019) explained that TPACK is a revision from Shulmans's (1986) concept of pedagogical content knowledge (PCK) which maintains that effective teaching ability is when these two are equally integrated.

Koehler & Mishra (2009) gave a more detailed overview of the seven knowledge domains in this way:

- Pedagogical Knowledge (PK): Teachers' knowledge about the practices and methods of teaching and learning, including how students learn, classroom management, lesson planning, and student assessment.
- Content Knowledge (CK): Knowledge of the subject matter to be learned or taught.
- Technology Knowledge (TK): Knowledge about working with technology, tools, and resources in life and work and being able to recognize when it can assist or impede the achievement of a goal.
- Pedagogical Content Knowledge (PCK): Knowledge of the pedagogies, teaching practices, and planning processes appropriate to the specific content being taught. PCK covers teaching, learning, curriculum, assessment, and reporting conditions that promote learning.
- Technological Content Knowledge (TCK): Knowledge of the relationship between subject matter and technology in a given content discipline as well as understanding when the technology and content influence and or constrain one another.
- Technological Pedagogical Knowledge (TPK): Knowledge of the influence of technology on teaching and learning as well as the use of technology regarding pedagogical designs and strategies, this includes understanding how teaching and learning can change when technologies are used in specific ways.
- Technological Pedagogical Content Knowledge (TPACK): Knowledge of the complex interaction among content, pedagogy, and technology, which is the basis for effective teaching with technology (Koehler & Mishra, 2009, pp. 61-65).

Koehler & Mishra (2009) described the use of technology in teaching and learning needs to be demonstrated in an integrated manner. The TPACK framework accounts for explicit and formal knowledge typically taught in teacher education courses (Koh & Chai, 2016). Studies by Boschman, McKenney, and Voogt (2015) and Koh et al. (2015) revealed that more in-depth and broader understandings of how teachers approach information and communication technologies (ICT) are needed to understand the limitations of the TPACK framework. Researchers and educators used the TPACK framework (Mishra & Koehler, 2006) as a method to describe the knowledge required for teaching and technology integration with the intersection of pedagogical knowledge, content knowledge, and technological knowledge to design effective instruction with technology. Voogt et al. (2016) defined TPACK as “the whole knowledge and insights that underlie teachers’ actions with technology in practice” (p.38). Niess (2012) stressed the importance of continuing to investigate methods and learning paths across multiple courses for the integration and the development of TPACK within an entire teacher education program.

Methodology

The study used a convenience sampling method to gather the data on the specific issue of PST self-reported understanding and application in using the TPACK framework for technology integration the semester before their student teaching.

Participants

In this qualitative research study, the survey was administered in an elementary instructional methods and educational technology course to 38 PSTs. The courses are 16 weeks in duration with PST’s working on projects and assignments that include an intentional focus on technology integration. The majority of students were female (82%) with males (18%) comprising the sample.

The Measure and Procedures

Survey

A validated assessment instrument (Schmidt et al., 2009), *Survey of Preservice Teachers’ Knowledge of Teaching and Technology* was used with permission in this study. The survey contained 4 demographic questions, which included male/female, academic rank, academic major, and endorsement areas. Further, there were 57 items for measuring pre-service teachers’ self-assessments of the seven TPACK domains that included: 7 Technology Knowledge (TK) items, 16 Content Knowledge (CK) items, 7 Pedagogical Knowledge (PK) items, 8 Pedagogical Content Knowledge (PCK) items, 4 Technological Content Knowledge (TCK) items, 7 Technological Pedagogical Knowledge (TPK) items, and concluding with 8 Technological Pedagogical Content Knowledge (TPACK) items.

For the domain items, PSTs responded to each question using a five-point Likert scale: 1. Strongly agree, 2. Somewhat agree, 3. Neither agree nor disagree, 4. Somewhat disagree, and 5. Strongly disagree.

Data Collection Procedure

The survey was administered online in the courses following IRB approval. The PSTs were invited to participate via an email announcement in their Blackboard course site. The email contained a link to the survey for students if they wished to participate. The invitation clearly stated there was no obligation to participate and choosing to or not to participate had no impact on their grade in the course or their relationship with the faculty, college, or university. Participation was voluntary, and the survey was estimated to require approximately 15 minutes to complete. There was no compensation or points offered to PSTs.

Findings and Discussion

The TPACK model is represented by seven interrelated variables with the TPACK variable being a dependent variable of three other variables, TPK, TCK, and PCK, which are made up as derivative values of TK, CK, and PK primary forms of knowledge respectively. The descriptive statistics for the variables show normal distribution with the S.D. range .40 to .63, skewness less than 1.0, and kurtosis not exceeding .56. The Mean range for the variables is 1.8 to 2.2. The model shows a great reliability index (Cronbach's $\alpha = .93$).

The PSTs displayed a relatively high level of some form of agreement in understanding the primary forms of knowledge in technology (TK), content (CK), and pedagogy (PK). The highest absolute values representing agreement (94.7%) were noted in the TK variable (Q1), *I know about a lot of different technologies*, and the PK variable questions 1, *I can use a wide range of teaching approaches in a classroom setting*, 2, *I can adapt my teaching style to different learners*, and 6, *I can adapt my teaching based upon what students currently understand*. The CK variable brought a slightly lower absolute value of agreement, 92.1%, for (Q6), *I have various ways and strategies of developing my understanding of social studies*.

The lowest absolute values of agreement were observed in the TK variables (Q6), *I frequently "play around" with technology* (60.5%) and (Q3), *I keep up with important new technologies* (57.9%). Strong disagreement was reported four times, once in TK, (Q6), *I frequently "play around" with technology*, and PK, (Q4), *I am familiar with common student understandings and misconceptions*, respectively, and two times in CK, in questions 1, *I can use a mathematical way of thinking* and 9, *I have sufficient knowledge about mathematics*. Agreement on understanding literacy and its applications in the real world was the highest among other content domains of the CK variable (math, science, and humanities).

Some form of agreement in understanding the intersections of TCK, PCK, and TPK displayed by the PSTs was at a relatively high level only in the TPK variable. Survey questions 1, *I have the technical skills I need to use technology appropriately in teaching*, and 5, *My teacher education program has caused me to think more deeply about how technology could influence the teaching approaches*, had equal level of agreement (92.1%). The lowest value was in Q2, *I can adapt the use of the technologies that I am learning about to different teaching activities*, though still remaining high (81.6%). No disagreement was expressed in Q6, *I can choose technologies that enhance the teaching approaches for a lesson*, and Q7, *I can choose technologies that enhance students' learning for a lesson*.

Still lower some form of agreement was noted in the TCK variable (highest – 84.3% in Q2, *I know about technologies that I can use for understanding and doing literacy*, lowest – 71% in questions 1 and 3 which reflect the application of technologies in the math and science domains). All questions contained the same strong disagreement value (2.6%).

The PCK variable displayed contradictory results for the agreement in the variable items. The first four questions showed the lowest agreement values among all other agreement values (highest – 44.7 for question Q1, *I know that different mathematical concepts do not require different teaching approaches*, lowest – 36.8 for (Q4), *I know that different social studies concepts do not require different teaching*

approaches). These questions exhibited quite high disagreement values (strongly disagree and somewhat disagree), from 34.3% in Q1 to 39.5 % in Q2, *I know that different literacy concepts do not require different teaching approaches*. The second half of the PCK variable (Q5 – 8) displayed relatively high form of agreement with no strong disagreement (highest in Q8 (81.6 %), *I know how to select effective teaching approaches to guide student thinking and learning in social studies*, and lowest in Q5 (73.7%), *I know how to select effective teaching approaches to guide student thinking and learning in mathematics*).

The understanding of TPACK model was equally agreed upon throughout its eight items. The highest level of agreement (89.5%) was in Q5, *I can select technologies to use in my classroom that enhance what I teach, how I teach, and what students learn*, Q6, *I can use strategies that combine content, technologies, and teaching approaches that I learned about in my coursework in my classroom*, and question 8, *I can choose technologies that enhance the content for a lesson*. The lowest level of agreement (81.6%) was in Q7, *I can provide leadership in helping others to coordinate the use of content, technologies, and teaching approaches in my education program, school, and/or district*, though still remaining relatively high. No strong disagreement in understanding any of the questions was expressed.

The analysis of correlations between the constituting primary forms of knowledge and corresponding intersections showed that the TK variable has greater correlation to the TCK intersection than the CK variable (Pearson $r = .876$ and $.745$). For the TPK intersection, correlations of the TK and PK variables is nearly equal, (Pearson $r = .866$ and $.818$), while for the PCK, the correlation values are $.847$ for the PK variable and $.767$ for the CK variable. Overall, the TK variable is more correlated to both TCK and TPK intersections than the other two components, and the pedagogical knowledge is more correlated to the PCK intersection than the content knowledge.

The correlations between the three intersections of the primary forms of knowledge and the TPACK shows high correlation values for all of the intersections. However, for the TPK and the TCK, they were slightly higher (Pearson $r = .941$ and $.919$ respectively) than for the PCK (Pearson $r = .894$). All correlations are statistically significant with $p < .05$.

Summary and Implications for Teacher Educators

The results from this study offer implications for teacher educators and for the program. In summary, the PSTs have technical skills to use technology and can use it easily. This indicates the educational technology course is fulfilling its purpose in introducing the TPACK model and experience with varied technologies. However, we have been made aware that curriculum mapping is needed to plan optimal technology use in all coursework throughout the program and to eliminate gaps. Further, the program should develop a plan to help PSTs stay current with new technologies throughout the entire program, as technology changes so fast. This may be accomplished in conjunction with the curriculum mapping and will provide a plan for the intentional and continuous opportunities to integrate technology in lessons. PSTs reported sufficient knowledge in the area of literacy. This is not a surprise as the program has a strong commitment to emphasizing literacy. This reinforces that a planned, continuous, and committed focus in the program yields noteworthy results. The PSTs reported they can use a wide range of teaching approaches in a classroom setting and they understand that different content areas require varied teaching approaches, but they are unsure how to select the best approach for a specific content area.

To alleviate this gap, teacher educators should utilize varied teaching approaches in the content area courses. PSTs report their teacher education program has caused them to think more deeply about how technology could influence the teaching approaches in their classroom. However, there is a need for

teacher educators to naturally integrate more technology into all coursework in a planned and intentional manner using the TPACK mode. From this research, it is clear that students have sufficient knowledge and understanding of pedagogy, content, and technology, however, this general awareness does not necessarily transfer to their ability to successfully apply technology to specific content areas.

In summary, our study concurred with the research of Tondeur, Scherer, Siddiq, & Baran's (2017). They reported that PSTs had more positive attitudes about technology and greater confidence in the ability to use technology in instruction when seven key themes were present. The key themes included aligning theory to practice, having teacher educators as role models, reflecting on their attitudes on the role of technology in education, learning technology by design, collaborating with peers, scaffolding technology experiences, and receiving feedback throughout a program. The implementation of TPACK across these two courses supports piloting a program-wide adoption of this technology integration framework and creating additional opportunities for PSTs to use technology to support student learning.

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Table 1 Descriptive Statistics

Descriptive Statistics										
	N	Range	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
TK_Sum	38	2.71	1.00	3.71	2.2068	.63167	.478	.383	.119	.750
CK_Sum	38	1.88	1.00	2.88	2.0263	.45643	.052	.383	-.309	.750
PK_Sum	38	2.14	1.00	3.14	1.8233	.55022	.071	.383	-.559	.750
TPK	38	2.00	1.00	3.00	2.0150	.49852	-.003	.383	-.421	.750
TCK	38	2.08	1.14	3.22	2.1165	.44689	.578	.383	.531	.750
PCK	38	1.91	1.07	2.98	1.9248	.40801	-.168	.383	.213	.750
TPACK	38	1.79	1.14	2.94	2.0188	.41483	.167	.383	.052	.750
Valid N (listwise)										

Table 2: Technology Knowledge (TK)

Questions	Degree of Agreement	Mean	SD
I know about a lot of different technologies.	94.7	4.05	.62
I have the technical skills I need to use technology.	89.5	4.13	.74
I keep up with important new technologies.	57.9	3.53	.89
I know how to solve my own technical problems.	85.8	3.53	.92
I frequently “play around” with technology.	60.5	3.55	1.08
I have had sufficient opportunities to work with different technologies.	73.7	3.68	.93
I can learn technology easily.	84.2	4.08	.71

Table 3: Content Knowledge (CK)

Questions	Degree of Agreement	Mean	SD
I can use a mathematical way of thinking.	74.2	3.92	.91
I can use a literary way of thinking.	89.5	4.24	.71
I can use a scientific way of thinking.	78.9	3.87	.96
I can use a historical way of thinking.	71.1	3.86	.97
I have various ways and strategies of developing my understanding of mathematics.	76.3	3.82	.89
I have various ways and strategies of developing my understanding of literacy.	92.1	4.16	.72
I have various ways and strategies of developing my understanding of science.	73.7	3.71	.84
I have various ways and strategies of developing my understanding of social studies.	73.7	3.79	.91
I have sufficient knowledge about mathematics.	81.6	3.89	.79
I have sufficient knowledge about literacy.	89.5	4.18	.61
I have sufficient knowledge about science.	81.6	3.89	.61

What are the Factors That Make Beginning and Veteran Teachers Highly Motivated and Inspired in the Classroom?

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Abstract

The purpose of this paper is to research and analyze the factors that cause teachers to be and stay inspired, motivated, excited, and committed to providing quality instruction, quality learning, and develop enthusiastic students who see value in their educational experiences and learning. This study uses information from various sources to compile and synthesize relevant findings to support and highlight the motivations that teachers use and possess that allows them to stay in tune with curricula, new strategies, a good understanding of all students, and the ability to bring freshness of ideas and experiences into the lives of all students. In addition to research, this study used surveys to collect information from novice or intern and veteran teachers. The reviews allowed for the collection of relevant information from teachers in the field who stand out as self-identified and highly motivated, effective, engaged, and successful in staying energetic, well organized, use excellent learning/teaching strategies, and can deliver instruction that students find interesting, useful and relevant to their personal growth as exemplified by their superb learner outcomes/learning.

Keywords associated with the theme of this paper include inspiration, inspired, motivated, committed, passionate, energetic, effective, and successful.

Introduction

A dictionary definition of inspiration is “the arousal of the mind to special and unusual activity or creativity” (vocabulary.com). This definition defines many successful teachers who have found their calling in the teaching profession and have used their passion for quality instruction. And delivering the content to their students who are, in return, excited and motivated to learn because their teachers moved them to a higher calling of meaningful skills and creative thinking. These inspired teachers possess the knowhow and the commitment to their profession to stay energetic, creative, and motivated daily. They have discovered a truth that says:

Inspiration is....

It's not what you do; it's how you do it.

It's not what you see; It's how you look at it.

It's not how your life is; It's how you live it. (Author unknown).

Another definition of a motivated teacher states that “A motivated teacher is one who not only feels satisfied with his or her job, but also is empowered to strive for excellence and growth in instructional practice” (Frase, 1992).

A final definition (Mart, 2013) states that motivated and inspired teachers need passion. “Passion matters in that it motivates and inspires teachers. Passion leads to creativity; therefore, passionate teachers can think and produce new notions in an easy way” (p. 437).

Recognizing the characteristics of teachers who are motivated and inspiring is extremely important in cultivating their traits and behaviors so that others may also benefit from working and collaborating with them. Motivating and inspiring teachers to stand out and are usually leaders in their schools and districts because they are committed to providing quality education and also being involved in issues that affect all students in our society.

Purpose of the Study and Methodology

The purpose of this study was to look at different teachers and how they stay inspired, motivated, excited, committed, and successful in their day to day teaching. In addition to helping their diverse populations of students to stay focused, motivated, and interested in the learning experiences taking place in the classroom.

Two surveys were used to gather information from candidates in credential programs and from veteran teachers. The objective to find common ground in their responses regarding how they go about keeping their inspirations, attitudes, and work habits at a high level that allows them to inspire their students to learn to the best of their abilities. One survey was used for candidates and the other for veteran teachers. The surveys were sent to candidates in a credential program and veteran teachers in schools. The responses were analyzed and used to provide the information included in this research paper.

Review of the Literature

Many exceptional teachers help students to become eager and willing to learn so that they become successful in their schooling and their entire lives. The following quote best exemplifies the starting point about what kind of teachers are inspirational and motivational in helping to create a climate and learning environment that allows students to thrive socially, emotionally, personally, and academically.

“If you think back to when you were a pupil, which teacher caught your eye? Was it the one that stood at the front reading from a book or sheet of paper in a monosyllabic tone? Or perhaps it was the one who was animated and engaged – who showed they were truly passionate about their subject? Chances are it was the later...” (Rossati, 2017). This article points out that students are motivated by teachers who are passionate, inspirational, and motivating in teaching their subject areas with the vigor that excites students to want to be there with that type of teacher because learning was more exciting and relevant.

The article by Rosatti further describes personality traits that these inspiring teachers demonstrate, such as they often smile, are cheerful, have a happy and positive outlook on life and make the learning environment an inviting, stimulating, and adhered to the SEL model (social-emotional learning) that advocates for passionate teaching and learning where students are looked upon as creative and resourceful with the ability to succeed in school and in life (7Mindsets.com). In an article from teach.com, the statement made is that “It is nor an exaggeration to say that a great teacher can change a students’ life” (Teach, 2019). The article goes on to expound on the teachers’ role as role models who go beyond academic teaching. The inspired and motivated teachers make a difference in their students’ lives by trying to “reach them on multiple levels” in order to make sure that whatever learning takes place in the classroom, it impacts their students’ success and well-being outside of it. A good example of this is in an article written by Erin Vallejo, a teacher of Sophomore Advanced English in Dublin, California. She became interested in helping her students deal with “improving and supporting teenage mental health and social health” for students (Vallejo, 2017). Due to a student’s suicide, she created the “Elephant in the

Room” as a way of getting students together to talk and ask questions about their personal struggles so that students would not feel isolated. This social-emotional approach helps students feel connected, important, and have a positive view of themselves and life in general. She made use of social media to get the word out about “Elephant in the Room” as a way of helping students organize and finding support among their peers, teachers, and other adults.

A variety of studies (Garrison, 2004, p.1; Carbonneau et al., 2008, p. 978; Howard, n.d.; Rosati, 2017; Howard, 20) point out that inspired teachers are passionate, have a sense of values, are patient, and have a sense of humor. All of these factors allow these teachers to be open minded, enthusiastic, honest, committed, motivated, accessible, and global thinkers.

Additionally, inspired teachers in the classroom to accept all students equitably, use higher-level questioning, and encourage students to be active participants in all learning activities, with their focus being on successful learning outcomes for every student (Mart, January 2013).

Other studies show that inspired and motivated teachers make students feel empowered and allow for collaboration in small group activities for all students to exchange their personal perspectives, feelings, and opinions on what they are learning about and how that learning impacts them in their daily lives. In one article it states that “A motivated teacher is crucial to a successful classroom. They will look at teaching through a different lens and, in doing so, motivate their students in their learning too. Motivation helps to energize, direct, and sustain positive behavior over a long period of time” (Rosati, 2017).

Through this time of “accelerating change” (Kajitani, 2014), schools are at the forefront of this change, and this is cause for having teacher leadership to help students adjust, become knowledgeable, and use their skills to better fit into this new environment. According to Ryan and Cooper (2013), “An effective teacher must continually make decisions and act on those decisions,” demonstrating a repertoire of teaching skills that are believed to facilitate student learning” (p. 162).

From the students’ point of view, they like interest-based and relevant activities that are motivating, engaging, involve collaboration, allow for student input, and provide hands-on experiences and learning. In her article, Schwartz (2014) reported that a panel of students said that they would be highly motivated and try hard to learn if they had teachers that cared about them. According to that panel, “The number one thing that students on the panel said makes them want to try hard and succeed is knowing that teachers care about them and are part of the learning journey with them” (Schwartz, 2014).

Findings

The main question of both surveys was: Are you an inspired, motivated, and successful teacher? What makes you so? This was asked of both the veteran teacher and the intern candidates in order to get a collective sense of how they identified themselves. The responses included responses like the following:

- Part of being a motivated and inspired teacher comes through my general behavior and attitude. There’s a lot to be said for people that regularly smile, offer a happy and cheery outlook on life, and generally come across as upbeat and pleasant to be around – regardless of how they’re actually feeling.
- Making your classroom a warm, colorful, and stimulating environment is also key to creating a positive space.
- Recognizing hard work and offering praise will ensure your students stay encouraged and feeling as though their work is on the right track forwards and that I am noticing their efforts.

A second question asked: What caused you to want to become a teacher? The sample responses included the following:

- Love of subject matter
- Love of children/youth – enjoying to influence and watch them grow academically and personally
- Love of ongoing learning and teaching; touching the future
- Good pay; good benefits; good retirement
- Short teaching year that allows for family activities/long vacations for travel
- It's a recognized profession with good status
- My parents are teachers
- I remember my sixth-grade teacher and a couple of high school teachers who motivated and encouraged me to become a teacher.

A third question asked: What factors cause an inspired teacher to stay in the profession? The responses include:

- Inspired teachers stay in the classroom because they are effective in helping students learn at very high; They get satisfaction.
- Inspired teachers know how to excite and motivate students to become inspired learners through good classroom management: They are effective classroom managers.
- Inspired teachers know how to design and teach effective worthwhile lessons that provide all students with meaningful activities that help students to learn and master important content, knowledge, and skills for use in their lives.
- Inspired teachers have high but positive expectations for their students' success.

A fourth question on the survey asked: What should teachers strive for if they want to stay inspired? Some of the responses included:

- A good or inspired teacher is made through a variety of acquired and learned skills.
- Teaching is seen as a dynamic skill that needs to be refreshed through ongoing retraining, practice, and refinement on a regular basis.
- Teaching methods and strategies are varied in order to tap into students' intelligences and learning styles.
- Use of technology in the classroom is valued and applied to a variety of learning situations.
- Motivated and inspired teachers work collaboratively with others for common purposes.

A fifth question asked: What advice would you give to other teachers, beginning or experienced about how to stay motivated/inspired and connected to teaching, to family and profession?

- Teaching requires high energy and acting performance; be open to always learning and sharing information; Students can tell if you are fair and sincere.
- Remember the saying, "Children don't care how much you know, but how much you care." We can make or break a child's spirit. It is important to love what you are doing each day; Come prepared to teach, love what you are teaching, and expect that what you do and say each day will make the life of a child better.

A sixth question asked: What are the changes that you make in your life, attitude, ongoing practices, and relationship with others in your school community that help you adjust and continue to be motivated and inspired daily?

- Work in a collaborative environment; I just focus on my students who are the center of what I do... I ignore everything else; continuous learning
- I accept constant change from the administration; Planning with teachers helps me grow professionally; My students come as they are which I accept as individuals.

A seventh question asked: Rate yourself according to being motivated and inspired on a scale of 1-10 where 10 is the highest score.

Response Range:

- 7—9 Veteran teachers
- 7-8 Intern teachers

Recommendations

It is important to note that no one teacher recognized as motivated and inspired, possess all of the characteristics, beliefs, and levels of motivation and inspiration. This research strives to show that varying levels of motivation and inspiration work successfully for those teachers who have an intrinsic feeling about who they want to be in the teaching profession.

An important point to be made from both veteran teachers and interns is that motivation and inspiration can be fostered through a change of attitudes, beliefs, practices, and outlook. Valuing the changing landscape of our educational system includes the diversity of populations of students, the specific needs of these various groups of students, the needed skills and working relationships demanded by an ever-changing world, “the impact of technology on the lives of both students and teachers” (South, 2017), and the extent to which teacher empowerment is provided in the school setting and in the community.

For veteran teachers, research (Kajitani, 2009) stipulates that high-quality professional development where teachers have a role in organizing how to handle problems dealing with good teaching practices, dealing with students’ individual needs, building good relationships between teachers, students, parents, and the community. Teachers need empowerment and sharing of leadership with school administrators to feel satisfaction and accomplishment in who they are and in what they are doing. Teachers need ideas, practices, and resources to help students with their social-emotional issues through activities that help them build good mental health attitudes and the will to feel connected to peers and others in the school and community. Young students do feel overwhelmed and separated from others, which causes them to turn to drug abuse, negative attitudes, violence, and suicide. If teachers are provided with the skills and support they need, they can help these students lead happy lives.

For new teachers, the research (Teach, 2019) indicates that they become overwhelmed with classroom management, not having enough experience with instructional demands, the general demands of the teaching profession, and the significant amount of personal and family time they have to dedicate to their teaching responsibilities. To help these teachers, schools need to provide high-quality professional development dealing with the common core standards, the needs of all students (including special needs, ELL, and struggling students). Helping all students equitably

should be highly supported to make sure that students develop strong social-emotional skills to help them overcome different obstacles in school and out of school.

A quote from a well-known author, John Steinbeck: (Newsom, 2012)

If you are very lucky, you may find a teacher. Three real teachers in a lifetime is the very best of luck. My three had these things in common:

(1) They all loved what they were doing. (2) They did not tell - they catalyzed a burning desire to know. (3) Under their influence, the horizons sprung wide and fear went away and the unknown became knowable.

I have come to believe that a great teacher is a great artist... that there are as few as there are any other great artists. Teaching might even be the greatest of the arts since the medium is the human mind and spirit.

John Steinbeck (1902-1968)

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Effective Reading Instruction: Blending Literacy Skills for Digital and Traditional Texts

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The electronic revolution and its emergence of digital text have altered the traditional concept of literacy. New literacies refer to the latest forms of scholarship made possible by digital technology. Electronic textbooks enhance their written text with resources such as videos, websites, and dictionaries. Thus, the concept of "text" has become more inclusive. Students are learning to read trade books, informative articles, social media, song lyrics, online newspapers, poetry, video games, websites, subtitles to movies, emails, and more digitally. The skillset needed for being a capable reader is rapidly changing.

Long before the current generation of students arrives at the schoolhouse, they have started the process of acquiring information from printed material via a virtual plethora of delivery systems. Two and three-year-olds are figuring out how to expand a picture with their fingers and changing pages with the slide of a fingertip. They are learning to manipulate smartphones, e-readers, tablets, and computers.

New technologies are creating a need for students to acquire additional skills and abilities to communicate and interact with the digital domain. New literacies include those competencies and skills needed to use the digital world to generate thought and to communicate in multiple formats. Students are learning to surf the internet, create blogs, and "Tweet" answers to comprehension questions. The digital text expands the concept of literacy even further to include using information and communication technologies to find, evaluate, create, and communicate information, which requires both cognitive and technical skills.

Unfortunately, there is no consensus on how to blend the requisite skills for digital reading and writing into the predominantly paper-based instructional setting. However, just because students have been born into the digital era, it is not safe to assume that they are all familiar with operating digital devices and managing their associated distracting features. Literacy teachers

must be knowledgeable of the theories of traditional reading instruction to be effective at blending the skills needed for reading efficiency in the informational age. Different texts require different teaching strategies.

Theories of Learning to Read

Understanding how students learn to read and write guides the instructional approaches that teachers select to use. Classically literacy has meant the ability to use reading and writing for a variety of tasks both within and outside of school. When selecting instructional approaches to literacy, there are several schools of thought. Behaviorists focus on the observable and measurable aspects of students' behavior. The process of learning to read is perceived as a conditioned response that is teacher-centered, with the teacher being a dispenser of knowledge. Instruction in reading is a series of discrete skills and subskills with teachers using direct instruction to impart skills in a planned and sequential order. B. F. Skinner (1978) asserted that teachers present information in small increments, the learning is reinforced through practice, and drill until it is mastered.

The constructivist theory embraces students as active and engaged learners who construct their knowledge. Constructivists do not consider learning as an observable development because it involves mental processes. They believe students integrate new knowledge with their existing knowledge. Rather than being dispensers of instruction, teachers engage students with experiences that help them to construct their own knowledge. Jean Piaget (1969) stipulated that students' experience is organized into schemas, and learning is the modification of students' schemas as they interact with their surroundings.

Sociolinguists perceive that language and social interaction are essential to learning. Oral language provides the underpinning for learning to read and write. The Russian psychologist Lev Vygotsky (1978) hypothesized that language aids in the organization of thought and that students use language to both learn and communicate experiences with others. He explains that students learn more through two processes: the zone of proximal development (ZPD), and scaffolding. The ZPD represents the distance between where a child is in the learning process and the level of potential development that can be obtained under the guidance of a teacher. Scaffolding is the various assistance techniques that teachers use to help students accomplish a new task or skill. The ZPD is an ever- evolving target. As students learn new skills or acquire new abilities, the zone moves progressively forward.

The sociocultural theory advocates the inclusion of a cultural dimension to our comprehension of how students learn to read. Within this theory, reading and writing are viewed as social activities that emanate from the culture and community in which students live. These theorists believe students from different cultures have different expectations about literacy and possess different ways of learning. Advocates of the culturally responsive model recommend the building of bridges between the home, community, and school. Banks et al. (2005) contend that teachers from this school of thought be willing to examine their instructional practices and acknowledge the legitimacy of all students' culture and social customs.

Comprehensive literacy programs combine teacher-directed instruction and student-centered activities. Within the classroom teachers, create the circumstances and conditions that support learning. Scaffolding is a significant aspect of all instruction as students evolve from dependent to independent learners. Learning book organizations, including table of contents, chapter titles, headings, boldface type, topic sentences, glossary, and index components, start in the primary grades. Teachers help primary students interpret everyday symbols, follow directions in locating information, and begin to use simplified reference material to answer questions.

As students mature to the intermediate grades and beyond, reading instruction becomes more detailed. The Common Core Standards (2018) increasingly require more complex books and references. Students are reading more authentic literature, learning content, and expressing themselves in a written and visual format. How is literacy instruction in the digital age shifting to meet these learning demands?

From elementary grades and beyond, students are using reading skills in content areas. An increasing number of informational texts are now produced in digital formats. Unfortunately, a certain number of experts in the field are perceiving comprehension as suffering from using a digital learning environment (Herold, 2014). Reading skills that are used in content reading include:

1. Acquiring the vocabulary unique to the field. Each content area has a heavy vocabulary load. Teachers scaffold student learning by teaching contextual skills, structural, and dictionary tactics.
2. Developing concept knowledge. While some students can pronounce individual words in content passages, they may not understand the crucial ideas. Teachers can facilitate learning technical vocabulary and concepts by using the term, explaining the idea through pictures and diagrams, point out examples, and non-examples.
3. Reading varied texts and related materials flexibly. The purpose of understanding the material becomes essential. Students learn to realize that reading rates can and should be flexible, depending on the degree of comprehension necessary. Reading is not limited to printed-paper. Digital text is found on computers, tablets, e-readers, smartphones, video, films, signs, and more.
4. Using text features and graphic aids. Students should receive assistance in learning to read supportive materials such as graphs, charts, maps, and tables. They learn to understand the meaning, background factors, distortions, and interpretations of visual and graphic aids. Within both linear and nonlinear material, students learn to deal with guided and independent synthesis. Guided synthesis occurs when the text material refers the reader to graphic images such as pictures, graphs, and tables.

Independent synthesis is when pictures, videos, graphs, and tables and such are included, but the text does not explicitly refer the reader to the material. Graphics, maps, globes, videos, web sites, art, and such contribute to a visual dimension for students' understanding of the world around them.

5. Attaining the ability to interpret symbols and abbreviations. Symbols are commonly used to convey selected material with relative simplicity in a limited amount of space. Official titles for organizations, laws, chemicals, and more are given shortened names, for example, ISIS, and OPEC.
6. Understanding and perceiving visual symbolism. A veritable vocabulary of visual metaphors, sign, logos, and symbols exist for students to learn to understand. Every culture has a set of basic symbols that are recognized by members of the culture to represent particular objects or conditions. These cultural expressions can be either concrete, such as road signs, and traffic lights, or abstracts, such as placing the hand over the heart as a symbol of respect for the flag.
7. Interpreting pictures. Comprehension of visuals and pictures does not occur through osmosis. To completely understand images, students need to comprehend the purpose of the picture, clarify unfamiliar concepts, and know the facts and details. For example, students from rural warm weather areas might not understand the reason for sky bridges connecting buildings in cold-weather cities. The function of these bridges needs to be explained.
8. Utilizing multimedia videos, film, and television can be tremendous instruments in students' learning that other forms of literacy instruction cannot readily accomplish. They can recreate the past, thus putting life into environments beyond the local community, or condensing a process such a flower blooming into an observable sequence. These visual effects can be tremendously powerful but come with some significant limitations. Additionally, some visual images can be so convincing that students are tempted to accept their message without applying critical thinking skills. Students need to learn the propaganda techniques that are used by sponsors and advertisers of visual entities.
9. Expressing comprehension using visual and musical media. Students must learn to express their creative ideas through both auditory and visual means cameras, video, musical instruments, and graphics can serve as an extension of students' eyes, permitting them a unique way of seeing and recomposing the world around them.

10. Acquiring composing skills with word processors and touch screens. Students have at hand highly facilitating editing aids such as spelling, grammar, syntax, and word checks. The use of font styles, point sizes, boldface, italics, and color can add additional dimensions to such writings as poetry, literature, and science projects.

As school systems across the United States are increasingly providing digital textbooks, laptops, and tablets for all students, educators must be knowledgeable of techniques to address digital literacy skills. Teaching literacy skills for both contexts is necessary to preserve what is needed in both worlds, digital and traditional, for students to be competent readers.

Role of Technology in Reading

Technological advances in the digital text are expanding possibilities for using tablets, computers, and e-readers to support reading instruction and content area learning. Digital formats offer a valuable tool for the direct instruction of basic skills. Heitin (2016) cogently notes that literacy experts agree that all students should be learning with a mix of print and digital texts. However, adding digital reading to the already demanding mission of teaching students foundational print skills can be formidable. Heitin posits that there is no consensus on the "how-to" application of digital capabilities into literacy instruction. Unfortunately, teachers have few guidelines for including digital education. On the plus side, students' exposure to both print and digital reading early in their schooling is a way of reflecting what is authentically reading.

In addition to learning reading and writing skills, educators are starting to recognize the importance of keyboarding skills for software programs, internet usage, and standardized test-taking. Unfortunately, many students are developing hunt-and-peck encoding habits that will be difficult to convert to efficient keyboarding.

Digital reading can be different from print reading. Print materials are typically linear and sequential. Printed books and textbooks are configured to be read from front to back and from left to right. However, digital reading commonly has additional aspects. Hypertext features of books are dynamic and are referred to as nonlinear. The digital world allows for integrating words, pictures, diagrams, video, and sound to foster students' creation of meaning. Many online texts have related materials that the reader must evaluate and prioritize as they synthesize information. Also, web pages can possess interactivity that engages students. Regrettably, if not carefully taught, students can learn to dislike these features as being distracting to their core objective of gaining comprehension from the text.

Using word processors for the literacy skill aspect of writing can have spelling, grammar, and language usage assistance. A prime example of this assistant feature is Grammarly.com (2018). Most word processing programs have built-in dictionaries and thesauruses that help edit writing. The internet permits students and emerging adolescents to create and share work, using various programs to make graphics, presentations, and multimedia projects. Electronic references and web pages can help students to do online research, create web pages, and email. Nevertheless, a

drawback of online writings is that it makes cutting and pasting material much more accessible. Consequently, students will actually do less of their own writing.

As students' progress in school, digital technologies offer appealing interactive mechanisms for both general and targeted practice. Students can receive immediate corrective feedback, and some programs include enticements for growth to higher levels of difficulty. Teachers can receive tracking information about students' progress for both formative and summative assessment.

Hans and Hans (2013) cite several advantages of using computers, for reading instruction.

1. **Interactive software** - Commercial reading software can engage students via producing their own questions. Students can work together in groups, and the software can lead the students through guided practice.
2. **Commercial software uses scientifically assisted educational research** - The developers of these programs are generally upon the most productive teaching strategies.
3. **Computer software generates positive learning development** - These programs help students to learn to read critically.
4. **Interaction** - The interactive potential of computer-assisted learning has been used for the past quarter-century. The value of using computers in interactive settings as a strand to group practice is well established. Furthermore, computers can generate interaction between readers and text material.
5. **Power** - The speed of computer data retrieval is outstanding. Students can have almost instant access to a wide variety of materials.
6. **Screen Adjustments** - Screens can be adjusted to various point sizes to make reading easier. However, students have to be conditioned to read by scrolling. Generally, it is easier to thumb through pages to locate information than it is to scroll.

Electronic Textbooks

Electronic textbooks are making significant strides in educational settings. A mixture of viewpoints exists regarding claims that electronic textbooks are superior or inferior to paper textbooks in achieving student comprehension. However, for the reasonable future, students will be using both formats in learning to read and reading to learn in. This is not going to be a simple process of interchanging paper and digital formats. There will be additional skills to be learned. For example, students will need to understand pushing, left and right-clicking, scrolling, and jumping. As new e-reader technology evolves, researchers will need to investigate if they allow readers to extract as much meaning from the text as traditional paper versions. Both the digital format and traditional textbooks have their own advantages and disadvantages. Niccoli (2015)

suggested that there are conflicting results pertaining to the effectiveness of digital versus traditional texts. The findings of this study hinged primarily on the reading levels of the students. Proficient readers used digital texts with far less difficulty with higher comprehension levels compared to lower-level readers. Knowing student's literacy strengths and weaknesses appear to be vital in determining what types of texts are most effective for individual students.

The advantages of electronic textbooks are numerous. Readers can be built in so that oral reading of passages can be conveyed to students. This is particularly helpful to those struggling readers who are being taught subject content. Electronic pens can markup critical reading passages, and readers can insert comments. Definitions of keywords can be easily checked, and searches are done for essential terms for students with physical limitations. Students who have difficulty holding a book and turning pages independently can receive assistance. For those students who comprehend a text when reading to them but have trouble- decoding words can receive support with electronic textbooks. Other reading problems that can receive assistance include tracking and distractibility issues. English language learners can be reinforced in ways far superior to printed textbooks.

Electronic textbooks are not without limitations. For most students, it takes longer to read an electronic passage than a printed page. Pages may contain hyperlinks, video and auditory clips, images, graphics, share buttons, or comment sections; these ancillary features can require the reader to stop and make a decision rather than consistently reading through the material. While advocates point to reduce the weight of printed pages, electronic textbooks can be cumbersome in a different way. The storage space that is required to supply the books could consume considerable storage space.

Pros and Cons Digital vs. Print

Digital Textbooks	Printed Texts
Pros:	Pros:
Less expensive	The linear progression of content
Never out of stock	Smell of paper
integrated Dictionary/Thesaurus	Durability and reusable
Hyperlinks and networks	Fewer distractions
Publisher supplements and video	No need for tablet or e-reader
Easily searchable for specifics	Faster overview of chapters
Easy storage and location	Better recall of facts
Greater focus on concrete detail	No internet connection required
Point size adjustable for print	Less cognitive load
Reading nonlinear	Higher levels of comprehension
Cons:	Cons:
Restricted use and resell	Cost
Electronic devices need	Only one book per package
Numerous features to overwhelm	Bulky
Can lead to inappropriate content	
Eyestrain	
Slightly slower reading speed	

Conclusion

As individuals progress from childhood to adulthood, they will be reading, researching, and using both paper and digital text. It will be our job as educators to facilitate the growth and skill acquisition that are required by both mediums. Also, we will need to learn more about when is the optimum time to use both. When can students learn best from electronic textbooks, and when is it advantageous to use printed books? The types and lengths of texts also come into question as students are required to switch between varied kinds of documents. There are certainly advantages and disadvantages to both types of texts. Educators must be trained in teaching the literacy skills needed for both and be able to convey those skills to their students. Different literacy strategies are necessary for students to be proficient in both digital and traditional texts, and students must be able to seamlessly move from one medium to the next to be efficient readers in this digital age.

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