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An Exploratory Study of the Trends Emerging from a Forced Shift to a Digital Interface on University Faculty's Instructional Design

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AN EXPLORATORY STUDY OF THE TRENDS EMERGING FROM A FORCED SHIFT TO A DIGITAL INTERFACE ON UNIVERSITY FACULTY'S INSTRUCTIONAL DESIGN

by

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ABSTRACT

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University of Nebraska, 2021

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The COVID-19 crisis upended the typical college experience as educational institutions had to close campuses and send students home mid-semester in the spring of 2020. The COVID-19 pandemic left educators around the world with limited choices on how to move forward with high quality education for all. This abrupt closing of higher education facilities forced an immediate pivot to online synchronous or asynchronous digital classrooms for faculty and students and ushered in emergency remote teaching. While higher education has gradually expanded online offerings every year over the past twenty years, for many college students, classes were still in person until the pandemic swept across the world in March 2020.

This exploratory research study investigates trends emerging during a forced shift to a digital interface on university faculty's instructional design regarding course content, assessment, and student engagement during the COVID-19 pandemic. A mixed data approach was used including an online self-assessment survey and in-depth online course shell reviews. This information was utilized to answer three questions for this study: What differences or patterns are taking place in content delivery? What differences or patterns are taking place in assessment? What differences or patterns are taking place

with student engagement? The survey was administered to 46 faculty members who taught during the 2021 spring and/or summer semesters during the worldwide COVID-19 pandemic and 27 of these 46 faculty members agreed to an in-depth course shell review during the same timeframe.

Results from the survey indicated faculty had a high sense of self-efficacy with technology and felt confident finding technology tools, learning to use them, and implementing them during instruction. The data analysis indicated emerging practices around the following themes in content delivery, assessment, and student engagement: (a) consistent use of a set of technology tools, (b) video lectures, (c) active learning, (d) online assessments, (e) written feedback, (f) rubrics, (g) multiple means of communicating with the instructor, (h) students providing rich feedback to peers, and (i) synchronous opportunities for students to connect with peers.

This research adds to the field of knowledge on emergency online teaching, online learning, and high-quality online courses by sharing the trends that emerged from teaching during this historic moment in time.

DEDICATION

I am so grateful for each person who has crossed my path and shared their genius with me. Thanks for shaping me into who I am today.

To my parents Dennis and Patricia, who love me unconditionally, showed me that true joy comes from serving others, and provided me a solid foundation. You gave me the blueprint to follow to have an amazing life. Thank you for supporting me and cheering me on every step of the way from both heaven and earth. To my favorite (and only) brother Dennis, thank you for always being there for me through the ups and downs of life. I'm grateful you are my brother. To my husband Roger, you were chosen for a reason and are such a treasure. Your encouragement, support, and love are constant. Thanks for making my dreams come true. We are better together.

To my incredible children, Nathan, Megan, Michael and Matthew and their spouses Caitlin, Peyton, and Lexy, you are loved. It has been my greatest honor to be your mom. Thanks for all your support, love, and patience while I earned this degree. I believe in each of you and love you so very much. The world is better because you are here. Make this world a happier place.

"Spread love everywhere you go. Let no one ever come to you without leaving happier."
Saint Mother Teresa

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Finally, thank you to all the faculty who participated in this research. You took a risk to be vulnerable and share a glimpse into your classrooms during an unprecedented time in education. You are the heroes.

"Alone we can do so little, together we can do so much," Helen Keller

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CHAPTER 1

INTRODUCTION

News agencies reporting about a deadly virus originating from Wuhan City, China captured the attention of world health officials at the end of 2019. Fifty days after the first case was identified, a novel coronavirus (COVID-19) had killed more than 1800 and infected over 70,000 people in Wuhan (Shereen et al., 2020). On March 11th, COVID-19 was formally declared a global pandemic after cases were discovered and treated in 113 countries (Khanna et al., 2020). As the virus spread, modern life changed. Businesses and schools closed worldwide, which affected 1.37 billion students (UNESCO, 2020). The closures forced university faculty to quickly shift their teaching modalities to accommodate recommendations provided to each state by the Center for Disease Control (CDC).

In order to de-densify physical gatherings, preschools to graduate schools (PK-16), continued to achieve learning objectives using technology that delivered remote lessons and communicated virtually with students and stakeholders. This unprecedented event forced the deployments of mass technology and professional development initiatives to take root immediately. Faculty with negligible experience delivering online instruction were forced into a position of remote or online instruction with instructional designers and support staff unable to meet the demands for online faculty support (Piotrowski & King, 2020). Faculty had to design, teach, and assess learning in remote and online learning environments that relied heavily on technology, internet, video conferencing, and learning management software. Faculty needed to excel at using these

technologies so learners could continue to have a high-quality educational experience despite the sudden shift to the digital interface due to the COVID-19 pandemic.

Problem Statement

The COVID-19 pandemic forced faculty into creating digital learning experiences for their students as campuses around the nation closed in March of 2020. With the virus continuing to spread, directed heath measures were put into place which included social distancing, where people maintain a distance of six feet apart, mask wearing indoors in public places, and limiting the size of indoor gatherings (*COVID-19 State Overview*, 2021). These restrictions were intended to slow community transmission rates and decrease the strain on medical facilities. The directed health measures pushed educational institutions to reimagine teaching and learning mid-semester in the spring of 2020 in order to slow the spread of the virus and flatten the curve so medical facilities would not be overwhelmed with patients. For colleges and universities, this meant an immediate shift in teaching modalities, forcing faculty to convert face-to-face and hybrid courses to remote or online courses mid-semester to ensure learning continuity. Faculty rapidly learned how to leverage video conferencing to connect with students synchronously for teaching the course and to host virtual office hours. Faculty also mastered how to utilize learning management systems for online access to course content, administering assessments, and developing a collaborative classroom culture with a variety of opportunities for student engagement.

It was critical for faculty to excel at delivering instruction remotely and online. Students needed faculty who knew how to incorporate best practices for online

instructional design to create meaningful learning experiences. Faculty had to rethink assessment strategies, especially for face-to-face assessments such as labs, speeches, experiments, etc. (Piotrowski & King, 2020). Faculty had to employ a variety of active learning strategies virtually to ensure students learned and engaged with the content, with one another, and with the instructor. With isolation of the pandemic, students could benefit from faculty who knew how to cultivate and develop student-student and faculty-student relationships in the digital setting. Creating a classroom culture where these attributes can flourish necessitates faculty who have the professional learning and continuous technical support to be successful whether learning takes place in person, hybrid, online, or in remote classrooms.

Purpose of the Study

Therefore, the purpose of this study was to explore trends emerging from a forced shift to an online interface on university faculty's instructional design at a Midwest Metropolitan University during the COVID-19 pandemic.

Research Question

Within the context of technology, what trends emerge as a result of a forced shift to a digital interface on university faculty's content delivery, student engagement, and assessment?

Definition of Terms

Active Learning: Occurs when students are engaged in more activities than just listening. They are involved in dialog, debate, writing, and problem solving, as well as higher-order thinking, e.g., analysis, synthesis, evaluation" (Bonwell & Eison, 1991).

Assessment: Systematic bases for making inferences about the learning and development of students. It is the process of defining, selecting, designing, collecting, analyzing, interpreting, and using information to increase students' learning and development (Erwin, 1991).

Asynchronous learning: all types of learning that does not occur at the same place or time.

Blended Learning: "any formal education program in which a student learns at least in part through online learning, with some element of student control over time, place, path, and/or pace;" (Horn et al., 2014, p.34).

Content delivery: Providing course materials to students in a digital format.

Emergency Remote Teaching: "A temporary shift of instructional delivery to an alternate delivery mode due to crisis circumstances" (Hodges et al., 2020, p. 2).

Hybrid instruction: A mix of in-person instruction and either remote or online instruction, with reduced contact time on campus.

Online instruction: Asynchronous instructor-student interactions using digital technology, with students able to interact with each other and the instructor at flexible hours.

Multimodal Learning Environments: Instructional elements are presented in more than one sensory mode: visual, auditory, written, kinesthetic.

Remote instruction: Instructors and students meeting synchronously using digital technology (e.g., Zoom) at the scheduled times according to the Registrar's calendar.

Student interaction: Meaningful student to student and student to faculty dialogue and activities. Socially interactive learners are engaged learners (Vacca & Vacca, 2002). "Students learn more when they are able to talk to one another and be actively involved" (Routman, 2004, p. 207).

Synchronous learning: all types of online learning in which learners and instructors are meeting at the same time using video conferencing software.

Technology: Digital devices, hardware, software, and connectivity that allow the use of digital content in the classroom.

Theoretical Frameworks

Technological Pedagogical Content Knowledge

Educators must have a solid understanding of pedagogy, curriculum, and technology to integrate technology successfully. The Technological Pedagogical Content Knowledge (TPACK) framework was developed in 2006 as a theoretical framework for understanding knowledge educators must have to integrate technology effectively (Mishra & Koehler, 2006). Often, technology knowledge is seen as something separate from content and pedagogy expertise. However, the TPACK framework puts technology in the center of the learning. When educators are fluent with technology tools, adding both pedagogy and content creates new learning opportunities. As the depth and breadth of the technology tools increases, both pedagogy and content combine creating new pedagogical opportunities.

TPACK (originally TPCK) is the knowledge that lies at the intersection of Content Knowledge (CK), Pedagogical Knowledge (PK), and Technological Knowledge (TK). The TPACK framework goes beyond seeing these three components as separate, but rather intertwined (Florida Center for Instructional Technology, 2019). There are seven components required for technology integration to occur: content knowledge (CK), pedagogical knowledge (PK), technological knowledge (TK), pedagogical content knowledge (PCK), technological content knowledge (TCK), technological pedagogical knowledge (TPK), and technological pedagogical content knowledge (TPACK). Each component is equally important. It is at the intersection of the three: technology, pedagogy, and content knowledge, that allows educators to create deep, rich learning experiences. An understanding that emerges from the interplay among content, pedagogy, and technology knowledge is technological pedagogical knowledge, (Koehler & Mishra, 2013).

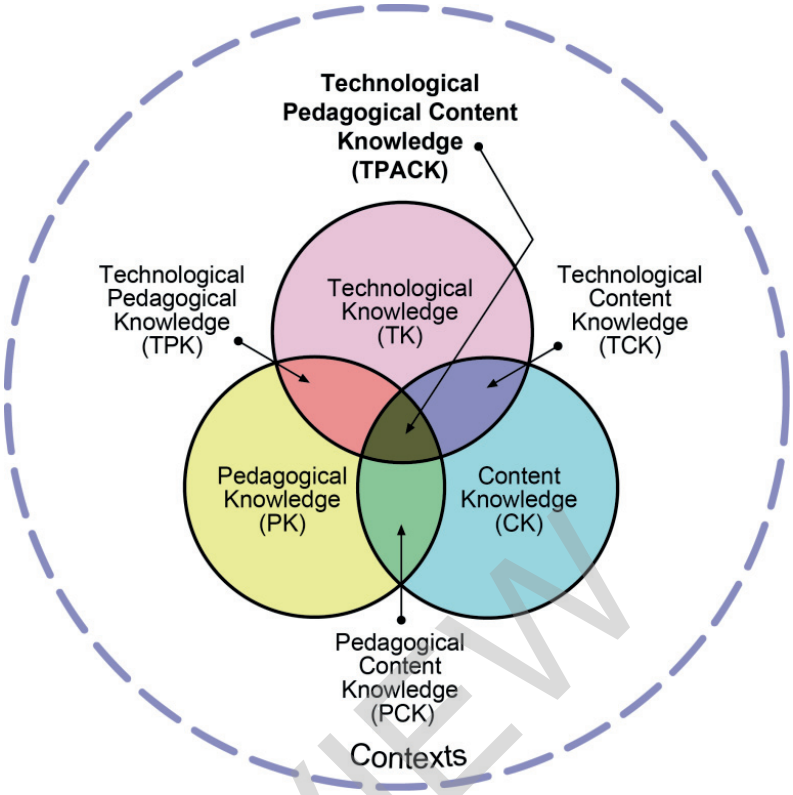


Figure 1. TPACK - Technological Pedagogical Content Knowledge (Reproduced by permission of the publisher, © 2012 by tpack.org)

The interplay of technology with pedagogy and content is significant because many educators still see technology as separate, even when they have been provided professional learning (Brinkley-Etzkorn, 2018). Despite skill development training, instructors rated themselves higher on pedagogical skill development than on technological skill development which shows they still see these as separate components (Brinkley-Etzkorn, 2018). Developing technological pedagogical knowledge skills is a process of reflection and continuous learning for educators. "It is a process where teachers continuously have to evolve new ways of teaching, recording their observations, and interacting with their peers to find reliable and tested ways of using the technology," (Padmavathi, 2017, p. 7). Technological pedagogical knowledge is a developing process and evolves over time through technology interaction, (Koehler & Mishra, 2013).

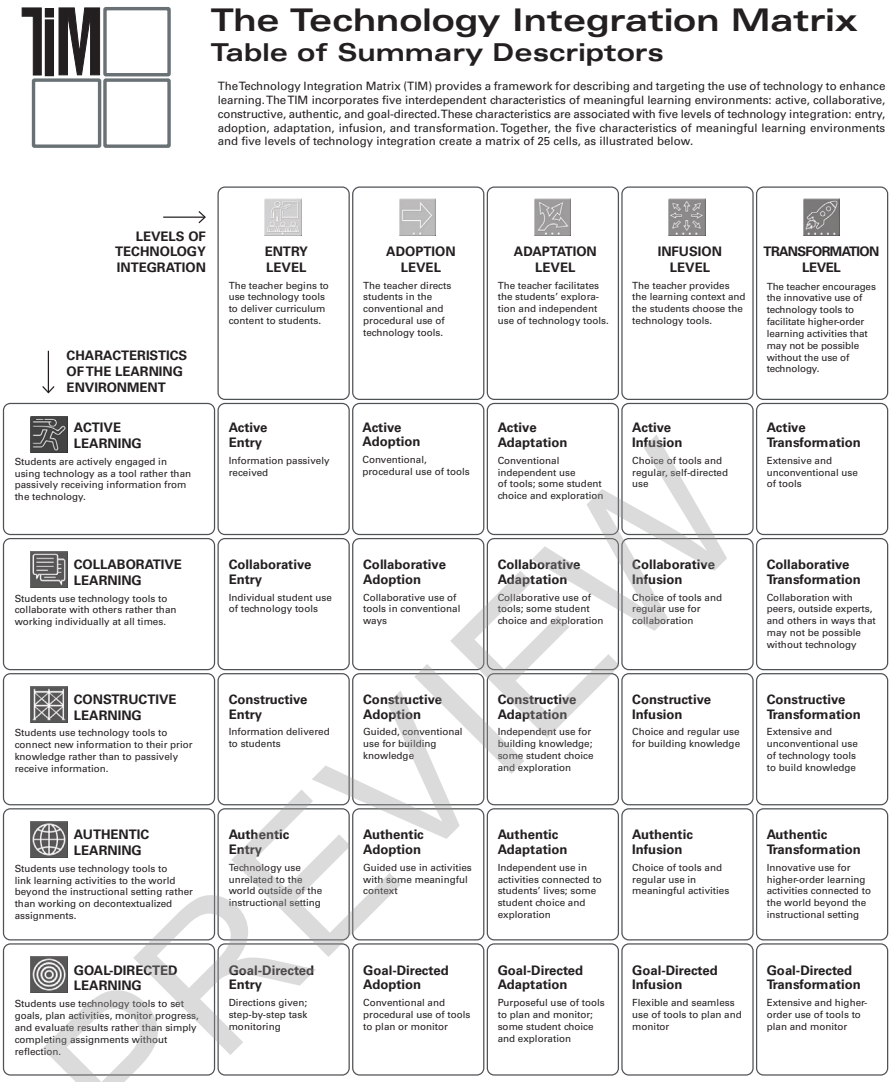
In the emergency remote teaching during the pandemic, the concept of technological pedagogical knowledge is relevant (Brinkley-Etzkorn, 2018). As the depth of technology knowledge increases, faculty can transform practice. “TPACK is an extension of PCK and is primarily achieved when a teacher knows a) how technological tools transform pedagogical strategies and content representations for teaching particular topics, and b) how technology tools and representations impact a student’s understanding of these topics,” (Graham et al., 2009, p. 71).

When faculty are faced with developing an online course for the first time, they may have to rethink their pedagogy as they leverage technology. “The relative newness of the online technologies forces these faculty members to deal with all three factors, and the relationships between them, often leading them to ask questions of their pedagogy, something that they may not have done in a long time,” (Mishra & Koehler, 2006. p. 1030). Examples of technological pedagogical knowledge might include a faculty member using a video lecture in an online or remote class. First, the faculty member must create the video which requires a technology skill set to record, edit and save the video. Secondly, the video must be posted to the learning management system which necessitates a different technology skill set and fluency with both the learning management software and the video software. Additionally, faculty must leverage instructional strategies to provide student interaction with the course content. Thus, pedagogy in the online classroom is informed by both content and technology creating new pedagogical strategies (Rust, 2019). In a study, teachers had the most confidence in TK followed by TPK, then TPACK which indicates technological knowledge as the basis for developing confidence in the other two forms of technological knowledge (Graham et

al., 2009). Therefore, deep learning opportunities for students occur because of innovations with the content and pedagogy practices as a result of increasing teacher efficacy with technology.

Technology Integration Matrix

The Technology Integration Matrix (TIM) was developed by the Florida Center for Instructional Technology (FCIT) based at the University of South Florida and the Florida Department of Education and is a framework to describe levels of technology integration and characteristics of the learning environment (Welsh et al., 2011). The five TIM characteristics of learning environments are: active, collaborative, constructive, authentic, and goal directed (*Florida Center for Instructional Technology*, 2019). The 25-cell technology integration matrix is a crosswalk of these meaningful learning characteristics with five levels of technology integration: entry, adoption, adaptation, infusion, and transformation (see Figure 2). The crosswalk forms a matrix where the levels of technology integration and the classroom characteristics of meaningful learning environments are intersecting. As educators move from entry to transformation levels of the technology integration matrix, innovation with the curriculum occurs and the classroom characteristics move towards self-directed learning, teacher facilitation, and robust use of technology.



The Technology Integration Matrix
Table of Summary Descriptors

The Technology Integration Matrix (TIM) provides a framework for describing and targeting the use of technology to enhance learning. The TIM incorporates five interdependent characteristics of meaningful learning environments: active, collaborative, constructive, authentic, and goal-directed. These characteristics are associated with five levels of technology integration: entry, adoption, adaptation, infusion, and transformation. Together, the five characteristics of meaningful learning environments and five levels of technology integration create a matrix of 25 cells, as illustrated below.

LEVELS OF TECHNOLOGY INTEGRATION → / CHARACTERISTICS OF THE LEARNING ENVIRONMENT ↓	ENTRY LEVEL	ADOPTION LEVEL	ADAPTATION LEVEL	INFUSION LEVEL	TRANSFORMATION LEVEL
	The teacher begins to use technology tools to deliver curriculum content to students.	The teacher directs students in the conventional and procedural use of technology tools.	The teacher facilitates the students' exploration and independent use of technology tools.	The teacher provides the learning context and the students choose the technology tools.	The teacher encourages the innovative use of technology tools to facilitate higher-order learning activities that may not be possible without the use of technology.
ACTIVE LEARNING Students are actively engaged in using technology as a tool rather than passively receiving information from the technology.	**Active Entry** Information passively received	**Active Adoption** Conventional, procedural use of tools	**Active Adaptation** Conventional independent use of tools; some student choice and exploration	**Active Infusion** Choice of tools and regular, self-directed use	**Active Transformation** Extensive and unconventional use of tools
COLLABORATIVE LEARNING Students use technology tools to collaborate with others rather than working individually at all times.	**Collaborative Entry** Individual student use of technology tools	**Collaborative Adoption** Collaborative use of tools in conventional ways	**Collaborative Adaptation** Collaborative use of tools; some student choice and exploration	**Collaborative Infusion** Choice of tools and regular use for collaboration	**Collaborative Transformation** Collaboration with peers, outside experts, and others in ways that may not be possible without technology
CONSTRUCTIVE LEARNING Students use technology tools to connect new information to their prior knowledge rather than to passively receive information.	**Constructive Entry** Information delivered to students	**Constructive Adoption** Guided, conventional use for building knowledge	**Constructive Adaptation** Independent use for building knowledge; some student choice and exploration	**Constructive Infusion** Choice and regular use for building knowledge	**Constructive Transformation** Extensive and unconventional use of technology tools to build knowledge
AUTHENTIC LEARNING Students use technology tools to link learning activities to the world beyond the instructional setting rather than working on decontextualized assignments.	**Authentic Entry** Technology use unrelated to the world outside of the instructional setting	**Authentic Adoption** Guided use in activities with some meaningful context	**Authentic Adaptation** Independent use in activities connected to students' lives; some student choice and exploration	**Authentic Infusion** Choice of tools and regular use in meaningful activities	**Authentic Transformation** Innovative use for higher-order learning activities connected to the world beyond the instructional setting
GOAL-DIRECTED LEARNING Students use technology tools to set goals, plan activities, monitor progress, and evaluate results rather than simply completing assignments without reflection.	**Goal-Directed Entry** Directions given; step-by-step task monitoring	**Goal-Directed Adoption** Conventional and procedural use of tools to plan or monitor	**Goal-Directed Adaptation** Purposeful use of tools to plan and monitor; some student choice and exploration	**Goal-Directed Infusion** Flexible and seamless use of tools to plan and monitor	**Goal-Directed Transformation** Extensive and higher-order use of tools to plan and monitor

Figure 2. Technology Integration Matrix (*Florida Center for Instructional Technology*, 2019)

The TIM provides a common language around technology integration in the classroom for educators and administrators and can be used to inform professional learning. Educators at the beginning levels of the matrix spend the majority of the time learning foundational technology skills with the devices and applications. They must invest some plan and instructional time learning the tools and also instructional time teaching the tools to the students (Winkelman, 2019). As both the educator and students

grow in their foundational technology skills, the shift to a focus on the curriculum and course content occurs and technology is used in more complex ways (*Florida Center for Instructional Technology*, 2019). When students employ technology tools to demonstrate mastery of course content, collaborate with peers, and use multi-modal reflection strategies, classroom characteristics emerge that indicate technology is intertwined with pedagogy and content. As lessons move across the matrix to more advanced technology skills, there is a shift in the focus from how the tools work, to utilizing the tools to interact with the course content in transformational ways and new pedagogical strategies emerge and are leveraged (Winkelman, 2019). As technology fluency increases, the classroom tends towards more complex uses of technology, student agency, and self-directed learners with the focus on course content, rather than on learning devices or the technology applications (*Florida Center for Instructional Technology*, 2019).

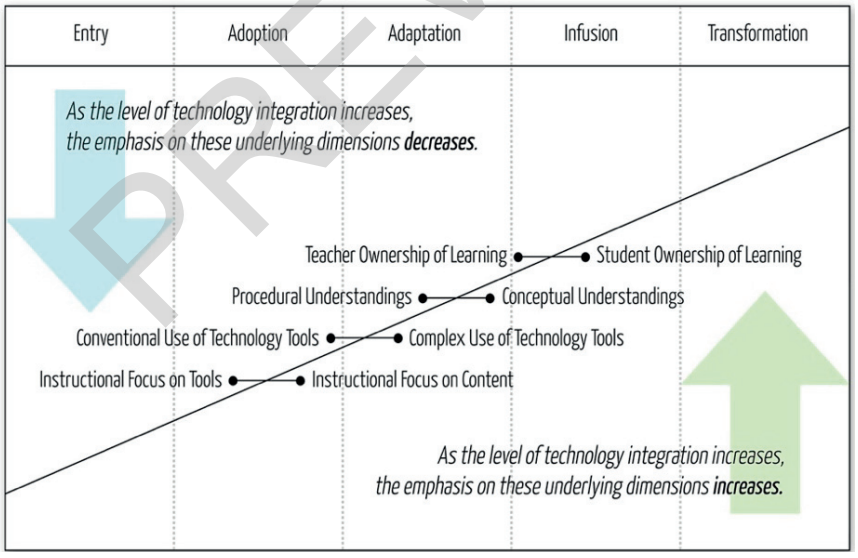


Figure 3. Dimensions of Technology Integration (*Florida Center for Instructional Technology*, 2019)

Significance of the Study

This research was exploratory and provided insight into initial patterns that

emerged in faculty's instructional design related to course content, assessment, and student engagement resulting from the forced shift to the digital interface during emergency remote teaching. Understanding these trends that emerged can provide insight to administration and faculty on designing online courses, developing professional learning aimed to prepare faculty to teach in the remote/online setting, best practices for online course delivery, online communication patterns, online assessments, and preparation for future crisis situations. This study could also benefit students by understanding the patterns that emerged.

This study contributes to existing research about emergency remote learning and online instructional design. Observations of trends adds to the body of research emerging on emergency preparedness in higher education, online course design, and student engagement in online courses. Further research could focus on how the pandemic was an accelerator for the technological and pedagogical changes in online course design. Additionally, future research could explore innovative uses of video conferencing software and learning management systems to foster a classroom community and increase student-student, faculty-student, and student-course content engagement.

Organization of the Study

This study takes on the format of a five-chapter dissertation. The first chapter is the introduction which introduces the purpose of the study, operational definitions, and theoretical frameworks. The literature review covering online learning, emergency remote teaching, online learning, adult learning, universal design for learning, evaluating online courses, and the CCASE conceptual framework is covered in Chapter 2. Following

the literature review, Chapter 3 describes the subject selection, methods of data collection, statistical analytics, instrument selection, and ethical considerations. The results of the study are detailed in Chapter 4. The summary of the study results and implications of the findings are in Chapter 5.

CHAPTER 2

LITERATURE REVIEW

Introduction

Teaching during a pandemic is a new educational frontier. When mandates from the Center for Disease Control (CDC) required state governors to lead school districts and universities to form safety policies, the abrupt change from in-person learning to emergency remote teaching required a shift in teaching methodologies mid-semester which challenged even the most seasoned and tech-savvy educators. The virus had been quickly spreading across countries in the world. By the end of March 2020, the United States, Spain, Italy, France, Germany, UK, China, Italy, Germany, France, China, Iran, UK, Turkey, and Belgium led the world as countries with the highest number of COVID-19 cases (Mudenda, 2020). In the United States, educational institutions sent students home before the end of March 2020, in an effort to slow the spread of the virus. Campus leaders worked tirelessly during this time to determine the next steps for students to successfully finish the semester remotely.

Although the internet had been used regularly for education over the past 20 years, access to devices, access to Wi-Fi, and access to robust download speeds were never a requirement for students until this unprecedented health crisis. Basic technology requirements for emergency remote teaching are hardware (internet access and device), software (video conferencing and learning management systems), and learning resources (Mohmmed et al., 2020). Even though 93% of the world's population live within a covered Internet zone, 3.6 billion people are not connected, leaving 30% of youth (ages 15-24) without access to educational resources (ITU, 2019). The abrupt migration to