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Beliefs of Higher Education Online Faculty Regarding the Integration of Multimedia

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Abstract

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Integration of multimedia resources in higher education curricula continues to be a concern for today's teachers, especially in identifying effective, efficient, and engaging resources that provide individualized instruction and meet a variety of learning needs. However, there was a gap in the literature regarding teachers' beliefs about multimedia integration within the context of adult learning in online higher education. The purpose of this basic qualitative study was to explore the benefits and challenges higher education online teachers experienced when integrating multimedia resources into their courses. The research question explored the beliefs of higher education online instructors about their experiences when integrating multimedia resources into higher education courses. Three rounds of faculty interviews were conducted with 10 teachers who worked at private colleges in the western United States to gather teacher feedback. Follow-up interviews supported additional insights, in-depth responses, and final interviews to clarify data and member checking. To effect positive social change in online higher education, findings from this study indicate that effective multimedia integrations increase student engagement, individualize instruction, foster meaningful teaching and learning apprenticeships, and enhance teacher performance, professional development, instructional support, and technical skills. These integrations inform educational stakeholders of the need to create more real-world, authentic learning experiences better suited to adult learners.

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Dedication

This dissertation is dedicated to my family: my husband, Raymond, our children, Kathryn and Perrin, my daughter, Nicole, her husband, Cory, and my grandchildren, Owen, Evelynn, and Hailey. You bring me joy and give me hope for a better tomorrow. Without your love and support, I would not have been able to complete this often overwhelming goal. You make life worth living.

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Chapter 1: Introduction to the Study

Introduction

Teaching and learning are significantly impacted by changes in educational technology. In today's higher education environment, whether students are taking courses in face-to-face classrooms or completing an online course or program, the curriculum is impacted by the choices instructors and instructional designers make related to integrating multimedia resources into the curriculum delivery and design (Clark & Mayer, 2016; Huang et al., 2019; King, 2017; Kolb, 2017; Mayer, 2021; Roblyer & Hughes, 2019; Spector, 2016). Teachers are faced with the challenges of how to select, integrate, and use instructional technologies and multimedia resources during instruction to create effective, efficient, and engaging instructional content (Clark & Mayer, 2016; Huang et al., 2019; Jones, 2020; King, 2017; Kolb, 2017; Mayer, 2021; Merrill, 2020; Roblyer & Hughes, 2019; Spector, 2016). In today's 21st century learning environment, teachers need to better understand how to select, integrate, and use multimedia resources (Clark & Mayer, 2016; Huang et al., 2019; King, 2017; Kolb, 2017; Mayer, 2021; Merrill, 2020; Roblyer & Hughes, 2019; Spector, 2016). Spefically, Kolb (2017) stated that researchers are examining ways that technology can "engage or excite students during a lesson" (p. 1). In their efforts to provide effective instruction, teachers need to determine how to use multimedia resources effectively to provide personalized and individualized instruction that reaches a wide variety of student capabilities and learning styles (Kolb, 2017). Moreover, according to Huang et al. (2019), educational technology

"can play a key role in helping an instructor develop personalized and individually appropriate learning activities" (p. 8).

In this chapter, foundational information is introduced in the background section, which examines the nature of educational technology and multimedia learning. I then clarify the problem statement, research questions, and purpose of the study. The conceptual framework and nature and scope of the study are established, and I provide definitions and assumptions. Next, limitations and significance of the study are discussed. The chapter concludes with a summary and transition to Chapter 2, which reviews the literature that provided the current and foundational context for understanding the nature of learning and the processes for creating the conditions necessary for learning in a technological era.

Background

As instructional technology is increasingly growing in use and expanding in capabilities, today's teachers are faced with the significant challenge of ensuring that multimedia integrated into online learning environments effectively meet instructional outcomes and diverse student needs (Clark & Mayer, 2016; Huang et al., 2019; King, 2017; Kolb, 2017; Mayer, 2021; Roblyer & Hughes, 2019; Spector, 2016). Researchers in the field of instructional design and educational technology have examined multimedia use in higher education online learning environments (Clark & Mayer, 2016; Huang et al., 2019; King, 2017; Kolb, 2017; Mayer, 2021; Roblyer & Hughes, 2019; Spector, 2016). According to Roblyer and Hughes (2019), five perspectives define educational technology: (a) a communications media viewing video as an effective means to deliver

information, (b) instructional systems and instructional design to provide a systematic approach for problem solving, (c) vocational training to provide a practical means for teaching all subject areas, (d) educational and instructional computing, which later became educational technology, and (e) learning sciences used to develop skills and conceptual knowledge.

In the process of defining educational technology, Spector (2016) emphasized that technology, like education, involves change, creating opportunity that did not previously exist. Educational technology is "inherently an interdisciplinary enterprise," involving "multiple disciplines, multiple activities, multiple people, multiple tools, and multiple opportunities to facilitate meaningful change" (Spector, 2016, pp. 10-11). In an effort to better understand the practices of educational technology, values and ethical principles must be taken into consideration, and educational technologists should have a "skeptical predisposition with regard to the application of educational technology to improve learning and performance" (Spector, 2016, p. 17). Educational technology has five elements that influence the learner experience: value, usability, adaptability, desirability, and comfortability, which should be considered when building a learning space (Huang et al., 2019).

In the digital age, King (2017) suggested that technology use has caused dramatic instructional changes and paradigm shifts in adult education as "more schools have begun to focus on student-centered, peer-, and self-directed learning rather than teacher-centered instruction" (p. 5). While a variety of theories "encompass the skills and orientation that adults need in order to be successful in the digital age" within the broader literature and

technology adoption and practice, "adult learning is seldom mentioned" (King, 2017, p. 5). Thus, integrating technology into adult learning poses a variety of issues for teachers as they address specific characteristics unique to adult learners, including wanting to know why they are learning something, using prior experience as a resources while learning, motivated by problem-solving and real-life situations, and being generally autonomous, self-directed learners (King, 2017).

According to Spector (2016), the understanding of perspectives on human development address diverse learning needs, highlighting Piaget's (1936) stages of cognitive development, Vygotsky's (1978) cognitive social mediated theory and zone of proximal development, and Erikson's (1950) psychosocial development. Spector highlighted relevant learning theory perspectives from behaviorism, cognitivism, constructivism, critical theory, and humanism, specifically Skinner's (1938, 1953) operant conditioning theory, Bandura's (1977) social learning theory, Lave and Wenger's (1991) situated learning theory, Kolb's (1984) experiential learning theory, and Sweller's cognitive load theory, to aide educational technologists in providing a "theoretical and empirical justification for change" (p. 82).

King (2017) discussed adult development models that chart the stages of adulthood and "contribute to understanding adult learners' adoption and learning of technology" (p. 66). Dewey's (1916) experiential learning, Piaget's (1951) cognitive development model, King and Kitchener's (1994) reflective judgment, Erikson's (1950) identity development stages, Piaget's (1972) stages, Kolb (1984), and Perry's (1970) schemes are among several major cognitive development theories in adult learning

literature (as cited in King, 2017). Dewey's (1938) experiential learning theory explained

that learners improved dramatically in understanding and skills when engaged in hands-

on rather than passive learning experiences (as cited in King, 2017). Dewey's concept of

experiential learning highlights the critical role of reflection, with a cyclical process that

alternates between hypothesis, testing, and revising based on experience with the model

incorporating "dynamic actions of working through perception, proposal, action, and

adjustment" (as cited in King, 2017, p. 68). Kolb (1976, 1984) popularized Piaget's

(1936) stages, sensorimotor, preoperational, concrete operational, and formal operational,

which have been "extensively used across educational contexts in the United States and

internationally for instructional design, teacher education, faculty development and

innovation" (p. 68). In addition, Kolb (1984) "formalized the first widely recognized

models of learning styles" with the digital age, providing "an abundance of opportunities

for learners to assess their learning preferences" with on-demand technologies and

enabling access to videos, audios, demonstrations, lectures, slides, and tutorials whenever

they have online or mobile access (pp. 74-75).

　　　King and Kitchener's (1994) model of reflective judgment has three levels of

thinking, prereflective, quasi-reflective, and reflective, and illustrated another dimension

of adult learning, documenting an understanding of how adult's knowledge and beliefs

"interact through the development of critical and reflective thinking skills" (pp. 68-69).

Perry's schemes focus on metacognition, that is how "individuals examine their own

reasoning processes" and has been a "cornerstone for additional adult and higher

education research, teaching, and student development services" (as cited in King, 2017, p. 69).

In addition to adult development models, learning theory and practice has been "anchored" by Bloom's (1956) taxonomy, providing a hierarchy of strategies from basic skills of comprehension through critical thinking, analysis, and interpretation (King, 2017; Huang et al., 2019; Merriam & Baumgartner, 2020). King (2017) noted the role of teachers for motivating learners and as facilitators to help scaffold learning to create connections between prior experiences and learning. In addition, the growing scope of innovation and spread of technology integration in today's digital age can create demands for autonomous, mastery learning (King, 2017). King defined the term andragogy as "the art and science of helping adults learn" (p. 86) and concluded that teachers need to

- seek and design learning opportunities consistent with real-world demands for autonomy and mastery;

- find opportunities to become confident in self-directed, autonomous learning;

- seek opportunities to cultivate and tap intrinsic motivation in preparation for work and daily life situations; and

- develop more authentic and real-life assessments to evaluate learning (p. 74).

In addition to providing an introduction and overview of educational technology and considering perspectives of educational technology, Huang et al. (2019) discussed instructional system design of learning activities and instructional experiences to support

knowledge and skill development. Huang et al. highlighted Bloom's (1956) taxonomy, Sweller's (1988) cognitive load theory, Mayer's (2009) theory of multimedia learning, and the ADDIE model of instructional design of intentional learning experiences (1975), while also highlighting four aspects of each learning activity: the learning task, the learning resources, the evaluation methods, and learning support. Huang et al. discussed inclusion of instructional technologies and the concept of design-based research in today's learning spaces, in which today's classrooms promote appropriate pedagogies and technologies and use a systematic approach for implementing innovations that promote independent, collaborative, and flexible engagement.

When integrating technology into instruction, Kolb (2017) cautioned teachers when using technology for authentic engagement because "students will eventually lose interest because they recognize that the technology is a mere trick and not actually adding value to their understanding of the content" (p. 2). Kolb recommended that teachers select tools that meet the needs of the instructional problem because using instructional technologies does not guarantee learning or comprehension. In addition, Kolb suggested that while a variety of frameworks for integrating technology in schools are commonly researched, they often tend toward comparing creative uses of technology with traditional instructional methods rather than focusing on practical applications to meet learning goals.

Clark and Mayer (2016) examined the promises and pitfalls of e-learning and suggested that benefits of new technologies depend on how they are compatible with cognitive learning process and research-based principles. Clark and Mayer defined e-

learning as "instruction delivered on a digital device" and considered the variety of forms

that e-learning takes, including storing and transmitting lessons, content relevant to

learning objectives, using media to deliver content, using instructional methods such as

examples, practice, and pictures to promote learning, being synchronous or

asynchronous, including collaboration, and being used to help learners build new

knowledge and skills to meet individual learning goals or improve performance (p. 848).

Today's 21st Century, teachers are faced with a variety of challenges when selecting,

integrating, and using authentic, effective, and practical multimedia resources that

address the unique characteristics of today's adult learner (Clark & Mayer, 2016; Huang

et al., 2019; King, 2017; Kolb, 2017; Mayer, 2021; Roblyer & Hughes, 2019; Spector,

2016).

Spector (2016) pointed to organizations like International Society for Technology

in Education (ISTE) and the Association for Educational Communication and

Technology (AECT) for providing standards and addressing the ongoing concern for

effective technology integration guidance. ISTE (2020) published standards for teachers,

students, administrators, and coaches, which provide support for teaching and learning

and guidelines and approaches to be successful in today's digital age (iste.org/standards).

The ISTE (2020) standards for teacher are intended to act as a guide for best practices for

uniting, technology, pedagogy, and content to create engagement and meet the needs of

today's learners (iste.org/standards).

Within the standards for teachers, ISTE (2020) categorized educator roles with

specific goals for each: learner, leader, citizen, collaborator, designer, facilitator, and

analyst. As life-long learners, teachers should "explore and apply pedagogical approaches made possible with technology and reflect on their effectiveness" (iste.org/standards). As leaders, teachers should "advocate for equitable access to educational technology, digital content and learning opportunities to meet the diverse needs of students" (iste.org/standards). As citizens, teachers should promote curiosity and critical examination of online resources that fosters media fluency and digital literacy (iste.org/standards). As collaborators, teachers should "use collaborative tools to expand students' authentic, real-world learning experiences by engaging virtually with experts, teams and students" (iste.org/standards). As designers, teachers should personalize learning experiences to meet the needs of diverse learners, while also fostering independent learning (iste.org/standards). As facilitators, teachers should "manage the use of technology and student learning strategies in digital platforms, virtual environments, hands-on makerspaces or in the field" (iste.org/standards). As analysts, teachers should "provide alternative ways for student to demonstrate competency and reflect on their learning using technology" (iste.org/standards). It is within this framework that teachers are expected to manage educational technologies in their classrooms.

According to the Department of Education Office of Educational Technology in the National Education Technology Plan (NETP), for an action plan to address the use of technology in education, if educators are to transform learning, they must create authentic learning experiences and technology effectively. Using the NETP, the United States has made progress in leveraging technology in teacher preparation programs and professional

learning. When defining roles and practices of educators in technology-supported learning, NETP identified opportunities for using technology to create authentic real-world learning experiences, for developing engaging and relevant learning experiences, and for using technology in meaningful ways (pp. 25-26). NETP recommendations included the following:

- Provide preservice and in-service educators with professional learning experiences powered by technology to increase their digital literacy and enable them to create compelling learning activities that improve learning and teaching, assessment, and instructional practices.

- Use technology to provide all learners with online access to effective teaching and better learning opportunities with options in places where they are not otherwise available.

- Develop a teaching force skilled in online and blended instruction.

- Develop a common set of technology competency expectations for university professors and candidates exiting teacher preparation programs for teaching in technologically enabled schools and postsecondary education institutions. (p. 37)

Today's teachers are faced with the significant challenge of ensuring that multimedia integrated into online learning environments effectively meet instructional outcomes and diverse student needs (Clark & Mayer, 2016; Huang et al., 2019; King, 2017; Kolb, 2017; Mayer, 2021; Roblyer & Hughes, 2019; Spector, 2016). Educational technology has an interdisciplinary nature with foundational pillars (Spector, 2016) and

perspectives defining its purposes and nature (Roblyer & Hughes, 2019; Huang et al., 2019; Spector, 2016), and it is marked by distinguishing characteristics when successfully integrated into teaching, learning, and performance (Spector, 2016). Integrating multimedia into teaching, learning, and performance is influenced by theoretical perspectives of human development and learning (Huang et al., 2019; Roblyer & Hughes, 2019; Spector, 2016) and adult learning perspectives (King, 2017; Merriam & Baumgartner, 2020; Roblyer & Hughes, 2019). Principles of andragogy become important in determining effective integration of multimedia resources in today's 21st Century eLearning and mLearning environments (Clark & Mayer, 2016; Huang et al., 2019; King, 2017; Kolb, 2017; Merriam & Baumgartner, 2020; Roblyer & Hughes, 2019). Therefore, multimedia integration should have practical learning goals (Kolb, 2017) and include adult learning issues of motivation, authenticity, automaticity, and scaffolding from novice to advanced learner as part of the online technology selection process (Clark & Mayer, 2016; Huang et al., 2019; Jones, 2020; King, 2017; Kolb, 2017; Mayer, 2021; Merriam & Baumgartner, 2020; Roblyer & Hughes, 2019; Spector, 2016). While ISTE standards and guidelines provide teachers with a framework for effectively integrating technology in teaching and learning, a clear need for teacher training and professional development related to using technology to create authentic real-world learning experiences, developing engaging and relevant learning experiences, and using technology in meaningful ways persists (NETP, 2020).

In my qualitative study, I examined the complex landscape of educational technology in today's 21st Century digital age. The history of technology use in

educational practice is filled with great expectations and often disappointing outcomes (Spector, 2016). Organizations like AECT, ISTE, and DOE described the transformative nature of educational technology, provided a framework for teachers to effectively integrate technology into teaching and learning, and identified a clear need for teacher preparation programs to develop effective online and blended instructors with the necessary digital competencies. Teachers experience a variety of internal and external barriers to effective multimedia integration while addressing the unique characteristics of today's adult learners (Clark & Mayer, 2016; Huang et al., 2019; Harrell & Bynum, 2018; King, 2017; Mayer, 2021; Merriam & Baumgartner, 2020; Roblyer & Hughes, 2019; Spector, 2016). However, there is a gap in the literature of technology adoption related to teachers' beliefs about multimedia integration in an adult learning context (Ertmer et al., 2015; King, 2017; Merriam & Baumgartner, 2020). Hence, I focused on teachers' beliefs regarding multimedia integration into adult online higher education.

Problem Statement

While higher education institutions have been using multimedia instructional resources for several decades, a problem exists in identifying effective, efficient, and engaging resources, integrating multimedia resources into instruction to provide effective individualized instruction and meet the needs of students (Clark & Mayer, 2016; Huang et al., 2019; King, 2017; Kolb, 2017; Mayer, 2021; Roblyer & Hughes, 2019; Spector, 2016). Multimedia resources have the potential to adapt to the needs of individuals and generate instructional messages and interactive elements (Clark & Mayer, 2016; Huang et al., 2019; King, 2017; Kolb, 2017; Mayer, 2021; Roblyer & Hughes, 2019; Spector,

2016). Using multimedia resources in instruction has great potential to transform learning and create individualized learner-centered instruction; consequently, teachers need to be able to determine how effective multimedia resources are in engaging learners, addressing a variety of learning styles, promoting learning, and creating individualized instruction (Clark & Mayer, 2016; Huang et al., 2019; King, 2017; Kolb, 2017; Mayer, 2021; Roblyer & Hughes, 2019; Spector, 2016).

Bandura (1997) argued that beliefs more than truth guide goals, decisions, and actions. Furthermore, Gill and Fives (2015) suggested that teachers filter and frame their decisions based on their beliefs, which can impact their teaching practices. More specifically, Schraw and Olafson (2015) examined the challenges and solutions when assessing teachers' beliefs, noting that teachers hold a variety of beliefs about educational issues, including learning, instruction, and pedagogy. Ertmer et al. (2015) noted that research on teachers' beliefs spans 60 years and over 700 empirical studies but suggested that additional research is needed to explain their use of digital technogies because of their pedagogical beliefs. In addition, Ertmer et al. suggested the need to evaluate the relationship between classroom practices and teachers' beliefs. I attempted to address this gap in the research by examining the nature of teachers' beliefs related to multimedia integration and use within the context of their online higher education classrooms. I explored teachers' pedagogical beliefs and how these beliefs may facilitate or hinder the integration of multimedia resources in their classrooms. The knowledge gained from this study provided recommendations for teachers, educators, and instructional designers as they design, implement, and determine appropriate uses for multimedia resources. In

addition, by better understanding teachers' beliefs about multimedia resources, additional contexts for training and professional development in the effective use of multimedia and digital technologies may be revealed. The problem is that there is a gap in the literature regarding teachers' beliefs of multimedia integration within the context of adult learning in online higher education so there is a need for my study in this area.

Purpose of the Study

The purpose of this basic qualitative study was to explore the benefits and challenges higher education online teachers experience when integrating multimedia resources into their courses. I explored teachers' beliefs regarding the challenges and benefits of multimedia resources as it influences selection, integration, and use of multimedia resources. I considered teacher professional development, social contexts, pedagogical beliefs, intentions to use educational technologies, and how those beliefs influence their intentions to integrate multimedia resources into instruction.

Within the context of educational technology in education and teachers' beliefs, a variety of recent studies have examined teacher characteristics to explain ICT use (Gil-Flores et al., 2017), teachers' behavioral, normative, and control beliefs related to digital literacy (Sadaf & Johnson, 2017); variables such teacher self-efficacy, autonomy, and attitude toward applying computer supported education (Lan, 2018; Yeşilyurt et al., 2016); digital instructional strategies to enhance the student learning experience (McKnight et al., 2016) faculty beliefs and use of mobile ICT, or m-ICT (Biddix et al., 2016); preservice teachers' intentions to use ICT in future lessons (Baydas & Goktas, 2016); and the social influences and nature of teacher professional development (TPD) as

it impacts ICT use (Van Den Beemt & Diepstraten, 2016). It is within this context of adult e-learning in higher education that I examined teachers' beliefs about integrating educational technology, specifically multimedia, into their instructional practices.

In this basic qualitative study, I explored the benefits and challenges experienced by higher education online instructors as they determine when and how to use multimedia resources in their instructional settings. Teachers' beliefs of the impact of multimedia resources explored as it influences faculty integration of multimedia resources. Through interviews with instructors, I explored teachers' beliefs of how multimedia impacts student engagement, how multimedia promotes the retention of information presented in the multimedia components, and if the transfer of learning to solving new problems occurs. I explored multimedia resources within the context of adult learning in online higher education and hope to contribute to the knowledge about quality improvements in instructional design practices in online higher education.

Research Question

Research question: What are the beliefs of higher education online teachers regarding the benefits and challenges they experience when integrating multimedia resources into higher education courses?

Conceptual Framework

Gagne et al. (2005) supported instructional strategies and cognitive concepts of creating the conditions necessary for learning as they relate to the development of individualized multimedia resources and integration of instructional multimedia resources in higher education. This theory of instruction encompassed five learning capabilities,

intellectual skills, cognitive strategies, verbal information, motor skills, and attitudes, and examined the internal and external conditions necessary for those learning outcomes to be achieved. Gagne went on to define an information processing model of instruction that highlighted external events that impact the internal learning processes of attention, selective perception, retrieval, response organization, control processes, and expectancies. In addition, he provided guidance for analyzing learning requirements, the selection of media, and the designing of instruction for learning.

While Gagne et al. (2005) provided an instructional and pedagogical approach to the use of multimedia, Davis (1989) provided guidance through the technology acceptance model (TAM) for predicting and explaining information technology use by users to include perceived usefulness and perceived ease of use, which Davis identified as key determinants of system use. Davis (1989) included several theoretical considerations, including Bandura's (1982) self-efficacy theory, Rogers and Shoemaker's (1971) adoption of innovation and cost-benefit paradigms from behavioral theory, and Swanson's (1982) channel disposition model, suggesting the convergence of findings in these disparate areas of research laid the foundation for his research. Davis et al. (1989) examined the resistance of users to adopt computer technologies, finding that perceived usefulness strongly influenced people's intentions to use technologies. It is within this framework of instructional and pedagogical design and use of educational technology that the beliefs of higher education online instructor are framed.

Nature of the Study

To identify the benefits and challenges experienced by teachers integrating multimedia resources into courses, I interviewed and triangulated the information provided by instructors. This basic qualitative research study addressed teachers' beliefs about the integration and use of multimedia resources in online higher education classrooms. In order to more fully understand teachers' experiences and beliefs, I asked about their professional development experiences, their pedagogical beliefs, and their intentions to use educational technologies, and I considered how those beliefs influence their intentions to integrate multimedia resources into their instruction. During the interviews, I asked about the types of multimedia resources they selected, when and how they used multimedia resources to explore their experiences with multimedia and identify the challenges they faced, and identified their beliefs related to multimedia integration in their online courses.

Patton (2015) stated that qualitative interviewing begins with the assumption that the "perspective of others is meaningful and knowable and can be made explicit" and that the goal of evaluation interviewing is to capture the experiences of participants (p. 426). Additionally, Olafson et al. (2015) suggested that qualitative studies are ideally suited to understanding teachers' beliefs by enabling researchers to talk directly to teachers with much to be gained by allowing teachers to tell their stories. Ravitch and Carl (2016) broadly defined qualitative research as a means for understanding individuals, groups, and phenomena in their natural settings to contextualize and reflect on the meanings inherent in those experiences. Moreover, Rubin and Rubin (2012) suggested that

responsive interviews are intended generate rich data related to the research question.

Rubin and Rubin discussed the nature of responsive interviewing in research, noting that

through interviewing, researchers explore the experiences and perspectives of others. In

this basic qualitative study, I explored the beliefs collected from interviews with teachers

regarding their beliefs about the integration of multimedia resources in their online higher

education environment. I interviewed online higher education teachers who taught at

local private colleges to better understand their perspectives regarding multimedia

integration in adult learning contexts.

Definitions

Adaptive learning: The use of "algorithms in technology to adapt learning content

based on the user's prior experiences of success or failure with similar content" with best-

of-breed systems capturing detailed user data and using learning analytics to "enable

human tailoring of responses" (Huang et al., 2019, p. 243).

Affordance: "That which is made possible by a technology" (Spector, 2016, p.

219).

Andragogy: "The art and science of helping adults learn" (King, 2017, p. 86) and

includes the "theories and approaches to learning and instructions specifically aimed at

adult learners" (Spector, 2016, p. 219).

Asynchronous: Interactions occur when "instructional or information is delivery is

time shifted" such that teachers and students can participate at different times from "same

or different locations, including email and discussion forums" and digitized e-learning

instructional resources that can be accessed at any time and from any place (Lever-Duffy & McDonald, 2018, p. 341).

Behaviorism: Learning theory that considers only "that which can be directly observed" in human actions to explain or predict learning (Spector, 2016, p. 219).

Behaviorists: "View all behavior as a response to external stimula" and believe that a learner "acquires behaviors, skills, and knowledge in response to rewards, punishments, or withheld responses associated with them" (Lever-Duffy & McDonald, 2018, p. 341).

Blended learning: Instruction that "takes partly face to face in the classroom, and partly online via a computer or mobile device," also referred to as hybrid learning (Hockly, 2016, p.137).

Collaborative learning: "A structured instructional interaction among two or more learners to achieve a learning goal or complete an assignment" (Clark & Mayer, 2016, p.454).

Cognition: The mental process "involved in learning and acquiring knowledge" (Spector, 2016, p. 219).

Cognitive apprenticeship: "An instructional design framework that proposes that as learners gain competence and confidence they require less and less explicit learning support" and includes six general instructional methods: modeling, coaching, scaffolding, articulation, reflection, and exploration (Spector, 2016, p. 219).

Cognitivists: "Focus on learning as a mental operation that begins when information enters through the sense, undergoes mental manipulation, is stored, and finally used" (Lever-Duffy & McDonald, 2018, p. 342).

Communication theory: Includes "theories, models, principles, and formats for representing, transmitting, receiving, and processing information (Spector, 2016, p. 219).

Communities of practice: Learning communities "centered around a common domain of learning, typically with more expert learners helping novices to become participatory members of the community of learners" (Roblyer & Hughes, 2019, p. 505).

Competency: A "collection of related knowledge, skills, and attitudes (KSAs) that enable a person to perform a particular task (Huang et al., 2019, p. 4).

Computer-assisted instruction: Consists of "software designed to help teach information and/or skills related to a topic; also known as instructional software or courseware, computer-based instruction (CBI), computer-based learning (CBL), computer-assisted learning (CAL), or generally as software learning tools" (Roblyer & Hughes, 2019, p. 506).

Computer-assisted language learning (CALL): Encompasses issues of materials design, technologies, pedagogical theories, and modes of instruction in language learning, and may include use of computers in "language testing, teaching, and learning in and out of class" (Roblyer & Hughes, 2019, p. 506).

Computer-based instruction: Traditionally categorized into tutorials, drill and practice, and simulation and games (Mesfin et al., 2018).

Computer-managed instruction: Software systems designed to track student performance data (Roblyer & Hughes, 2019).

Connectivism: A learning hypothesis that emphasizes "the role of social and cultural contexts" that uses the "metaphor of a network with nodes and connections" (Huang et al., 2019, p. 245).

Constructivists: "Believe that knowledge is a constructed element resulting from the learning process and that knowledge is unique to the individual who constructs it" (Lever-Duffy & McDonald, 2018, p. 342).

Constructivist learning, aka inquiry-based learning: A model for teaching and learning that "holds that learners should generate their own knowledge through experienced-based activities rather than being taught that knowledge by teachers" in which the "teacher scaffolds and helps students as they make contributions, identify questions, and gather relevant data" (Huang et al., 2019, p. 246; Roblyer & Hughes, 2019, p. 506).

Critical theory: "A perspective on education that challenges many standard and established educational practices as fundamentally dehumanizing or oppressive" (Spector, 2016, p. 220).

Culture: "The common practices and values of a group of people" (Spector, 2016, p. 220).

Decomposed theory of planned behavior (DTPB): An extension of TPB: users' perceived usefulness, ease of use, and compatibility (behavioral beliefs). Normative

beliefs are impacted by peer and influence of superiors. Control beliefs are specified as self-efficacy, technology facilitating conditions, and resource facilitation.

Diffusion of innovation theory: Considers adoption of information technology as a social construct that gradually develops through the population over time.

Distance education: The "delivery of instruction via various technologies to students who are separated from their teachers by time and/or location," and sometimes synonymous with *distance learning* (Lever-Duffy & McDonald, 2018, p. 343).

Education: "Processes involved in improving knowledge, performance, and understanding through systematic and sustained efforts" (Spector, 2016, p. 220).

Educational technology: The "study and ethical practice of facilitating learning and improving performance by creating, using, and managing appropriate technological processes and resources" (Huang et al., 2019, p. 246) and involves the disciplined "application of knowledge for the purpose of improving learning, instruction, and/or performance" (Spector, 2016, p. 220).

Effort expectancy: The degree of ease associated with consumers' use of technology (Mtebe et al., 2016).

e-Learning (aka computer-based instruction): The development of a computer program or series of programs with the explicit aim of replacing current methods of instruction, relying on technology to deliver instruction and provide interaction, and may be designed for self-study or instructor-led training (Clark & Mayer, 2016; Lever-Duffy & McDonald, 2018; Mayer, 2021; Mesfin et al., 2018).

Engagement: "Learner interaction with any aspect of the instructional environment" with successful engagement leading to "generative processing and learning" (Clark & Mayer, 2016, p. 458).

Environment: The "physical and psychological components that comprise the context in which learning and instruction take place" (Spector, 2016, p. 220).

Essential processing: "Mental work during learning directed at representing the content that is created by the inherent complexity of the content. More complex content requires greater amounts of essential processing" (Clark & Mayer, 2016, p. 458).

Experiential learning: iA "four-cycle theory of learning involving experience, observation, and reflection, concept and rule formation, and transfer to new situations" (Spector, 2016, p. 221).

Flipped classroom: A type of blended learning model "that uses instructional video watched outside of class as the primary delivery format for content with class time reserved for interaction and discovery learning" (Lever-Duffy & McDonald, 2018, p. 343).

Flipped pedagogy: Instruction in which students engage in concepts via "lectures stored as downloadable videos or vodcasts, independently before coming to class, then spend class time on other interactive learning activities" (Roblyer & Hughes, 2019, p. 508).

Formative assessment: Includes both "formal and informal assessment procedures used to measure ongoing student learning" (Hockly, 2016; p. 139).

Generative processing: "Relevant mental work during learning directed at deeper understanding of the content that stems from the motivation of the learner to make sense of the material" (Clark & Mayer, 2016, p. 460).

Habit: The extent to which people tend to perform behaviors automatically because of learning (Mtebe et al., 2016).

Hedonic motivation: Fun or pleasure derived from using a technology (Mtebe et al., 2016).

Humanism: "An educational perspective that emphasizes individual freedom and the value of the individual" and overall human development (Huang et al., 2019; p. 246).

Information and communication technology (ICT): A term used for technologies "used in education and training, as well as strategies for using them; originally in more common use outside of the United States, but becoming more popular worldwide due to UNESCO's ICT standards for education (Roblyer & Hughes, 2019, p. 509).

Information theory: Includes the "principles and models involving messages, encoding, transmitting, receiving, and decoding by machines and humans (Spector, 2016, p. 221).

Instruction: "That which is concerned with the optimal sequence that will help a learner master particular goals and become a self-sufficient problem solver in a targeted area" (Spector, 2016, p. 100).

Instructional design theory: "A comprehensive account of how to design effective instruction; an example of such a theory is cognitive apprenticeship which involves an instructional scaffolding strategy that recommends strong and explicit learning support

for novices and greatly reduced support for more advanced learners" (Spector, 2016, p. 221).

Instructional events: The "notion that specific kinds of activities promote learning; for example, Gagne (1985) proposes the following nine events: gain attention, inform learner of objective, stimulate recall of prior learning, present content, provide learning guidance, elicit performance, provide feedback, assess performance, and enhance retention and transfer" (Spector, 2016, p. 221).

Instructional strategies: "Closely linked with the type of thing to be learned" and act as "an organizing framework for a unit of instruction that involves one or more instructional principles" (Spector, 2016, p. 220).

Interaction: The "give and take between one or more learners and an instructional system or environment that may include human tutors and teachers as well as technology-facilitated components" (Spector, 2016, p. 222).

International Society for Technology in Education (ISTE): A nonprofit organization "dedicated to promoting appropriate uses of information technology to support and improve teaching and learning" (Lever-Duffy & McDonald, 2018, p. 344).

ISTE technology standards: A "series of national standards used to facilitate the use of educational technology by students, teachers, and educators to promote school improvement in the United States" (Lever-Duffy & McDonald, 2018, p. 344).

Learning: "A change in one's abilities, attitudes, beliefs, knowledge, and/or skills" and includes both processes, which include both cognitive and non-cognitive

factors, such as motivation, and outcomes, which are demonstrated through resulting changes in the learner" (Spector, 2016, p. 31).

Learning analytics: Involves "data-driven approaches that use large data sets and dynamic information about learners and learning environments for real-time modeling, prediction, and optimization of learning processes, learning environments, and educational decision making" (Huang et al., 2019, p. 246).

Learning management system: A "bundled resource tool that schools purchase to create fully integrated online classrooms," and allows for administration, documentation and tracking of student activity and achievement (Lever-Duffy & McDonald, 2018, p. 344).

Learning styles: The "notion that different learners learn best when information is presented in certain forms and activities structured in a particular way; for example, Fleming (1995) distinguished visual, auditory, read/write, and kinesthetic learners" (Spector, 2016, p. 222).

Mastery learning: According to Skinner (1938, 1953) and Bloom (1956), mastery learning is an "instructional approach in which students learn a sequence of objectives that define mastery of the subject" and demonstrate mastery of a skill before proceeding to the next one (as cited in Roblyer & Hughes, 2019, p. 510).

Mobile-assisted language learning: Language learning that is "assisted or enhanced" through the use of a mobile devices (Roblyer & Hughes, 2019, p. 511).

Multimedia: Uses multiple media or combinations of media, including graphics, photographs, sound, video, animation, and text for the "purpose of communicating information in multiple ways" (Roblyer & Hughes, 2019, p. 511).

Open educational resources or open courseware : The open provision of educational resources, enabled by ICTs, for consultation, use, and adaptation by a community of users for noncommercial purposes (Roblyer & Hughes, 2019).

Pedagogy: The "actual function of teaching or what teachers do when implementing their craft to assist their students' learning" (Lever-Duffy & McDonald, 2018, p. 346).

Performance expectancy: Degree to which using a technology will provide benefits to consumers in performing certain activities (Mtebe et al., 2016).

Personalized learning: The "dynamic configuration of learning activities, assignments, and resources to fit individual needs and expectations, based on an automated analysis of student profiles, past performance, current learning needs and difficulties, and what has worked for similar students with similar learning needs and difficulties" (Spector, 2016, p. 223).

Price value: The cost consumers incur as a result of using a certain technology (Mtebe et al., 2016).

Problem-based learning (PBL), aka project-based learning: "Learning organized around the investigation and resolution of an authentic, ill-structure problem," and is intended to foster "critical thinking, active learning, an collaboration during the

exploration of real-world scenarios, challenges, and dilemmas" (Roblyer & Hughes, 2019, p. 512).

Scaffolding: "The process of building bridges from prior knowledge as a baseline and moving students beyond that point," associated with learning theorist Vygotsky (Lever-Duffy & McDonald, 2018, p. 346).

Self-efficacy: The "personal belief a person maintains as to how well they can perform a task. Technology self-efficacy is the belief that one has the sufficient and correct abilities and skills to be successful when dealing with a technology related task," associated with learning theorist Bandura (Huffman et al., 2013, p. 1780).

Situated learning: "Learning that takes place in informal social contexts via meaningful interactions" (Hockly, 2016, p. 142).

Social cognitive theory: A framework for understanding, predicting, and changing behavior which introduces human behavior as a result of the interactions between personal factors, behavior, and the environment.

Social influence: Exten to which consumers perceive that important others believe they should use a particular technology (Mtebe et al., 2016).

Student engagement: The extent of students' involvement and active participation in learning activities (Heflin et al., 2017).

Summative assessment: Includes both "formal and informal assessment procedures used to measure student achievement" (Hockly, 2016, p. 142).

Synchronous: Instruction occurs at the same time but not necessarily in the same place, for example, instant messaging or voice chat (Hockly, 2016; Lever-Duffy & McDonald, 2018; Roblyer & Hughes, 2019).

Technology: "The practical and purposeful application of knowledge" (Spector, 2016, p. 224).

Technology acceptance model (TAM): Perceived usefulness and perceived ease of use affect intentions to use technology which in turn determine actual use of technology (two internal personal beliefs) – limited because it lacks consideration of external factors, such as user training and context of technology use (Davis, 1989).

Technology integration: The "seamless and unobtrusive use of one or more technologies to support targeted learning outcomes" (Spector, 2016, p. 224).

Technological pedagogical and content knowledge (TPACK): "The integrated set of knowledge pertaining to content, instructional methods, and technology affordances required to ensure effective technology integration in learning and instruction" (Spector, 2016, p. 224).

TPACK includes seven constructs:

1. *Technological knowledge* describes the ability to operate digital devices and using software

2. *Pedagogical knowledge* is knowledge of methods of learning and teaching

3. *Content knowledge* is subject matter expertise

4. *Technological pedagogical knowledge* is knowing how technology can be appropriately used in teaching methods

5. *Technological content knowledge* is knowledge of how technology can represent the subject matter

6. *Pedagogical content knowledge* is knowing how appropriate teaching methods can be applied to different subjects

7. *TPACK* is knowing how technology and pedagogy can be use fittingly for effective learning in different subjects (Reyes et al., 2017; Roblyer & Hughes, 2019; Spector, 2016).

Theory of planned behavior (TPB): Captures complex relationship between beliefs, attitudes, intentions, and behaviors. Contains personal and external beliefs, providing more explanations about direct or mediating effects of beliefs on intentions.

Three factors of TPB: Include subjective norm, perceived behavioral control, and attitude toward the behavior (attitude measured by behavioral, normative, and control beliefs.

Zone of proximal development: The "gap between what a student is able to do with or without the assistance of a more knowledgeable other, such as a teacher or a more experienced student; instruction should be aimed at this zone in order to be effective, according to Vygotsky" (as cited in Spector, 2016, p. 224).

Assumptions

I have made a number of key assumptions in this research study. The primary assumptions for this study were that the participating teachers used multimedia resources during instructions, were involved in the processes for selecting multimedia resources during instruction, and would openly share their beliefs about effective multimedia

integration for adult learners in an online higher education environment. Proficiency with the use and integration of multimedia resources was not evaluated for this study. Instead, it was presumed that instructors would face some challenges and barriers during this process, as indicated in the research question for the study. I assumed that research participants would be willing to share with me their beliefs about multimedia integration and their beliefs about the internal and external barriers to effective multimedia integration.

Scope of the Study

I conducted virtual interviews via Zoom with teachers who taught private schools in higher education environments in the western United States. The scope is limited to online higher education to narrow the focus of the research in the available literature. I used an interview study design through local private colleges in the western United States. I conducted three rounds of faculty interviews, with the first preinterview surveys focused on gathering instructor feedback from a wide range of instructors, an interview group of 10 instructors, follow up interviews to gain additional insights and depth, and final interviews for member checking and clarification as needed. The use of multimedia resources occurs throughout the learning experience of today's learners, but its prevalence in higher education made it a valuable context for further study.

Limitations

A limitation in this study was the small sample size inherent in the interview study design. Interview studies provide an opportunity to explore information rich examples of current practices and more fully understand the perceptions, beliefs, and

experiences of teachers in today's instructional settings. Given the small sample size, it was vital that I built trust with the participants for an accurate picture of the nature of multimedia use in higher education, teachers' beliefs about multimedia integration, about effective multimedia use with adult learners, and the challenges and barriers experienced by online higher education teachers. I recognize that the experiences that many of the participants in this study may have had may not reflect my own experiences with multimedia resources, and I needed to carefully examine each case to avoid potential researcher bias. Findings from this study may not be generalizable or transferrable to other areas of education, specifically elementary or secondary education, but may provide some insight into adult learning in online higher education settings.

Significance of the Study

Gagne et al. (2005) defined multimedia as a combination of instructional media, which include the various ways instruction can be communicated, including audio, video, text, photographs, animation, and graphics. In his seminal work, Mayer (2009) stated, "Designing multimedia messages is always informed by the designer's conception of how the human mind works" (p. 60). In order for teachers to design effective, efficient, and engaging multimedia resources, therefore, it is necessary to consider how the human mind works, how learning occurs, and how people acquire and integrate new knowledge. In his seminal work in instructional design, Merrill (2020) examined multimedia implementation for instructional strategies offering a set of principles and prescriptions for using multimedia for instructional events, format, navigation, interaction, and avoiding misuse of multimedia resources. Carr-Chellman and Rowland (Eds.; 2017)

contextualized the issues in technology, learning, and instructional design through a series of dialogues, including the learner-centered paradigm of instruction (Reigeluth & Harmon), learning from and with media and technology (Reeves & Saveyne), and the future of educational technology (Merrill & Dousay).

Ultimately, making a positive impact on society begins with making a positive impact on the lives of individual learners. To effect positive social change in higher education, researchers and educational practitioners must be steadfast in their efforts toward finding practical applicability of conceptual and theoretical frameworks of learning as a means for improving the overall quality of the education. It is, therefore, critical that methods for individualizing instruction to meet the unique needs of students be devised. Improving the level of engagement in higher education courses through the effective use of multimedia resources is one way that online teachers can positively impact student lives. By examining the use of multimedia resources in higher education, it is hoped that this qualitative research study reveals better ways of understanding the benefits and challenges experienced by teachers as they integrate multimedia resources into online instruction.

Summary

In Chapter 1, I provided an introduction to the study in the integration of multimedia in today's higher education environment, which included background information in educational technology, the nature of the adult learner, the e-learning context, and perceived promises and pitfalls of integrating technology into instruction. The conceptual framework was described, which was based on Gagne et al.'s (2005)

instructional strategies and cognitive concepts for creating the conditions necessary for learning, including learning outcomes and instructional events as they influence thoughts related to the use of multimedia and instructional technologies. Davis's (1989) TAM model for explaining technology acceptance and use was highlighted as a means for identifying key determinants for predicting and explaining multimedia use. This chapter also included the purpose of the study, reflected in the central research question, and described the need to determine effective methods for identifying effective, efficient, and engaging multimedia in instruction. The related research question addressed the factors relevant to identifying stakeholders perceptions of the challenges and criteria needed to identify and integrate effective multimedia in instruction. This chapter also included an overview of the research methodology, related definitions, assumptions, scope, delimitations, limitations, and significance of the study.

In Chapter 2, I provide an examination of current literature related to teachers' beliefs in the integration of multimedia. This examination revealed three study categories that form the structure of the literature review. First, many of the studies examined specific technologies that fell within the definition of multimedia or supported multimedia use in education, and often tested specific theoretical and conceptual frameworks of multimedia research within the e-learning and m-learning contexts. While much of the literature initially examined included discussions of the Mayer's cognitive theory of multimedia learning (CTML) and Sweller's cognitive load theory (1988) specifically, I generally did not include studies that specifically tested the principles or constructs of those theories. I retained articles describing the nature of multimedia for the

purpose of highlighting a change from discussions about multimedia itself to discussions

of information and communication technology. Second, research in multimedia was

restricted to focus on perceptions and beliefs about multimedia in teaching and learning

and explored the larger category of information and communication technology adoption

and examined various theoretical and conceptual frameworks associated with ICT,

including Davis's (1985) TAM, and a variety of studies attempting to extend and

accommodate for perceived gaps in the TAM, such as Vankatesh and Davis's (2000)

TAM2, and Vankatesh's (2003) unified theory of acceptance and use of technology

(UTAUT) and UTAUT2 models. Third, the research studies addressed questions related

to TPD and specifically teachers' beliefs and perceptions of technology integration,

which I restricted as much as possible to online higher education learning.

Chapter 2: Literature Review

Introduction

Despite several decades using multimedia instructional resources in higher

education, a problem exists in identifying effective, efficient, and engaging resources,

integrating multimedia resources into instruction to provide effective individualized

instruction to meet the needs of students (Clark & Mayer, 2016; Huang et al., 2019; King,

2017; Kolb, 2017; Mayer, 2021; Roblyer & Hughes, 2019). The purpose of this basic

qualitative study was to explore the benefits and challenges teachers experience when

integrating multimedia resources into their online courses. I began by highlighting

research on teachers' beliefs (see Five & Gill, 2015) and teaching (see Anderman &

Klassen, 2016) and implications of technology in education (see Fishman & Dede, 2016),

an overview of key concerns (see Skott, 2015), historical and theoretical perspectives (see

Ashton, 2015), issues related to the development of teachers' beliefs (see Levin, 2015),

and relationship between teachers' beliefs and practices (see Buel & Beck, 2015).

Spector (2016) examined the theoretical perspectives that provide the foundations

for the integration of educational technology into instruction and learning, including

theories of human development, theories of learning and performance, theories of

information and communication, and instructional theories and instructional design

theories. Spector suggested that educational technologists and instructional designers use

communications models to better understand characteristics of media to develop effective

learnering experiences. Huang et al. (2019) examined the role of technology in social

interactions, suggesting that specific features of technology can promote collaboration,

enhance cognitive performance, and foster deep understanding, encouraging engagement and more flexible learning experiences.

Educational technology stems from systems perspectives, basic sciences, and empirical research in such areas as cognition, learning theory, psychology, and information sciences (Spector, 2016). Huang et al. (2019) highlighted the need to use systematic methods to analyze educational problems to design and develop instructional support. The history of educational technology is filled with promises that educational technology will produce dramatic results, often without their realization (Spector, 2016). Huang et al. identified five historical stages of educational technology development, which included textbooks with text and pictures, slides and silent movies, educational television, audiovisual communications, and ICTs. In a discussion of intelligent tutoring systems (ITS) and typical educational systems like computer-aided instruction and intelligent computer-aided instruction, Huang et al. identified four technology components: the domain model, the learner model, the pedagogical model, and the interaction model, providing a framework for understanding the integration of technology into teaching and learning.

Huang et al. (2019) approached their discussion of educational technology from a competency-based approach, through which they examined the "knowledge, skills, and attitudes (KSAs) that enable a person to perform a particular task" (p. 4). The authors noted that previous educational technology books emphasized knowledge and skills to which they were inclined to emphasize attitudes, suggesting that attitudes and values "play a critical role in motivation," which is in turn "critical to success in nearly every

human endeavor" (p. 5). Educational and instructional systems are "a combination of two interacting and interconnected elements which function as an organic or integrated or coordinated whole," and in the case of education consists of the macro-, meso-, and micro-levels of community and four elements: inputs, processes, outputs, and formal and informal earning environments (Huang et al, 2019, p. 66). Educational system have three guiding principles: the overall principle, which "requires coordinating the relationships among teachers, learners, and resources;" the feedback principle, which emphasizes that an instructional systems need a feedback mechanism to provide formative and summative assessments to be effective and stable; and the order principle, which refers to the nature and structural functions of a system (Huang et al., 2019, p. 69).

Spector (2016) described the six foundation pillars of educational technology that influence what people do when in instructional situations: communication, interaction, environment, culture, instruction, and learning. Theories and principles of communication "form key aspects of the effective use of educational technology" (Spector, 2016, p. 20). The nature of systems thinking is "a critical component of the environment foundation," a process involving the development of an effective learning space (Spector, 2016, p. 22). While cultural considerations could be included within the environment pillar, the separation into a separate pillar is intended to provide educational technologists an opportunity to evaluate the effectiveness of technologies within the specific culture of each learning group (Spector, 2016). The instructional pillar "encompasses various instructional approaches, models, and strategies, as well as models, principles, and theories pertaining to the design of instruction," and the learning pillar is

"aimed at fostering and facilitating cumulative and productive changes that result in the development of expertise and understanding" (Spector, 2016, pp. 24-25). According to Spector (2016), "Something is well integrated when it is no longer the focus of attention" (p. 59) and is "marked by that technology being regarded by users as an unobtrusive facilitator of learning, instruction, and performance" (p. 166). When a technology becomes a "comfortable and trusted element," it can be regarded as successfully integrated (Spector, 2016, p. 166).

According to Spector (2016), an instructional theory "takes the best knowledge available from cognitive science and learning psychology, and uses that to devise instructional strategies (stated in the form of prescriptive instructional principles) intended to support the general flow" of instruction (p. 104). While learning theory is "primarily descriptive," instructional theory "provides a bridge between descriptive theories and instructional design by including a goal or targeted outcome," and instructional design theory "goes one step further by including the notion of a design that links methods of instruction based on instructional theory with targeted outcomes in an efficient manner" (Spector, 2016, p. 107). Spector highlighted "three general instructional frameworks that seem to hold a great deal of promise for instructional designers," to include Gagne's nine events of instruction, cognitive apprenticeship, and the four-component instructional design model (4C/ID), which divides tasks into recurrent tasks that can be practiced to automaticity and nonrecurrent tasks that gradually increase in complexity (p. 113).

According to Dwivedi et al. (2019) the "acceptance and use of information systems (IS) and information technology (IT) innovations has been a major concern for research and practice" (p. 719). Furthermore, Sherer et al. (2019) noted that while a "plethora of models exist explaining the influencing factors and mechanisms of technology use in classrooms," the (TAM and versions thereof have "dominated the field" (p. 13). Davis's (1986) TAM is based on the "Theory of Reasoned Action (TRA), to understand the causal relationships among users' internal beliefs, attitudes, and intentions as well as to predict and explain acceptance of computer technology" (as cited in Dumpit & Fernandez, 2017, p. 3). TRA is a "precursor to many models and is a frequently used theory of human behaviour for explaining technology adoption" and was the basis for the development of the more comprehensive TPB (Ajzen, 1985), which suggests that "user's actions are determined by their intentions and perceptions of control, while their intentions are influenced by their attitudes toward behaviour, subjective norms, and perceptions of behavioural control" (as cited in Dwivedi et al., 2019, p. 720). Meanwhile, Taylor and Todd's (1985) DTPB "combined elements and characteristics from both TPB and TAM in order to provide a more comprehensive understanding of technology adoption" (as cited in Dwivedi et al., 2019, p. 720). In addition to TRA, Davis (1992) used "motivational theory to understand the adoption and use of new technology" (as cited in Dwivedi et al., 2019, p. 720). In addition, Rogers's (1995) innovation diffusion theory has been used to provide a set of constructs for individual technology acceptance (as cited in Dwivedi et al., 2019, p. 720). Social

cognitive theory has also been extensively used to explain human behavior and extended to include information systems and technology (Dwivedi et al., 2019, p. 720).

Cuban (2015) commented, "There is a correlation between mandated or imposed uses of new technologies and implementation problems showing up in classrooms, particularly if teachers' legitimate concerns and needs are ignored in the policy discussions about improve teaching and learning" (p. 429). Cuban expressed concerns about using Rogers's (1995) diffusion of innovation theory in an educational setting because of its inherent linguistic biases against those who are slow to adopt technological changes, and because it "ignores the simple truth that in some situations with some innovations, teachers and other educations may have ample justification to say no to a new policy, a new device or software" (p. 428). Cuban suggested the hype cycle as an alternative historical path for technological innovation that divides the path into five phases: "technology trigger, peak of inflated expectations, trough of disillusionment, slope of enlightenment and plateau of productivity" (p. 428).

According to Dumpit and Fernandez (2017), Venkatesh and Davis (2000) proposed TAM2, an extension of TAM to include "the theoretical constructs of social influence and cognitive instrumental processes" (p. 4). Dumpit and Fernandez noted a trend in studies to identify "new constructs that play major roles in influencing the core variables" of perceived usefulness and perceived ease of use (p. 4). After reviewing and synthesizing several theoretical models, Venkatesh (2003) proposed UTAUT, which

> explained a considerable amount of variance in behavioural intention and usage
>
> behavior, the model theorized some relationships that may not be applicable to all

contexts, omitted some relationships that may be potentially important, and also excluded some constructs that may be crucial. (p. 719)

Sherer et al. (2019) noted that while TAM has "dominated the research landscape as the most commonly used model to describe use intentions and actual technology use," it "falls short of conceptualizing what it means to accept and integrate technology in classrooms" because it does not "specify which types of professional knowledge about teaching and learning with technology teachers must have in order to integrate technology meaningfully" (p. 14). According to Sherer et al., the TPACK is a "framework that defines different kinds of knowledge domains teachers need to become proficient in for successfully integrating digital technology in teaching and learning processes" (p. 14). While noting its importance in preparing preservice teachers, Sherer et al. suggested that Mishra and Koeler's (2006) TPACK framework "can lead to a better understanding about how teachers make decisions that affect technology acceptance and integration into teaching and learning processes" and those teachers who "perceived themselves as competent in the TPACK domains were more likely to 'accept' a new technology once they perceive it as relevant for specific didactical approaches within their subjects" (p. 14).

Kimmons and Hall (2018) surveyed teachers about known technology integration models to see what teachers believed made a valuable classroom model. One hundred twenty-nine K-12 teachers and teacher candidates responded to a one-time online survey and included who were required to integrate technology into their planning and teaching. Kimmons and Hall conducted this quantitative study to examine the foundational

considerations that guided teachers' "views about theoretical models of technology," determine "how they valued specific theoretical constructs when they were looking to adopt a theoretical model," and evaluate "how existing models aligned with these values and considerations" (p. 30). Participants were asked about their familiarity with four models: TPACK, technology integration planning, substitution augmentation modification redefinition, and replacement amplification transformation. Kimmons and Hall concluded technology integration should be "coupled with a good theory that is clear and practical" (p. 34). In addition, the authors believed that their findings had implications for teacher education programs because teachers valued models that contained "considerations of clarity, outcomes, and role of technology," recognizing the need for theoretical models that have a "discernible bearing in their classrooms and readily help them to achieve valuable goals" (p. 34).

Teo (2019) conducted a quantitative study to evaluate and create a proposed model to explain students' and teachers' intention to use (ITU) technology, based on the theoretical foundation of TAM, TPB, and UTAUT. Participants included 503 students and 592 teachers from schools in a South-East Asian country, who responded to an online questionnaire "designed to measure six variables: perceived usefulness (PU), perceived ease of use, attitude toward use (ATU), facilitating conditions, computer self-efficacy (CSE), and ITU technology" (Teo, 2019, p. 201). The author noted that the "question of what drives user adoption of technology, also referred to as user acceptance of technology, has become a key theme in educational research" (Teo, 2019, p. 202). The author identified teachers as "key players in any effective integration of technology in the

instructional process," citing evidence of the importance of teachers' "attitude toward engagement with technology to achieve their professional goals as the lack of technical support in schools, teacher's lack of confidence, and lack of realization of the advantages of using technology in teaching" (Teo, 2019, p. 202). Teo concluded that perceived usefulness and self-efficacy have "significant direct influences on attitude to use" technology, such that policy makers and teacher educators should "raise the awareness and skill level of students and teachers as part of the process to continue to use or phase in a new system" (p. 220). In addition, Teo found that "students and teachers are affected differently by the same variables and it is important to address such differences in order to move forward in any technology integration efforts in education" (p. 220).

Dinc (2019) conducted a qualitative study using descriptive analysis of 76 preservice teachers at a university in the north east part of the United States, taking a course in "integrating technology in education" (p. 385). When considering different views of technology integration, Dinc stated that "understanding how preservice teachers define and perceive the term is of vital importance" (p. 383). The purpose of Dinc's study was to "find out the current perceptions of preservice teachers about technology integration, their ideas about the barriers to technology integration in education, and gaining insight about technology integration in education to improve the current practices" (p. 384). Dinc found that preservice teachers believed "technology supports teachers' instruction and students' learning," but not all preservice teachers believed that technology should be used in all subjects (p. 392). Dinc also found that "preservice teachers living in the US, a developed country, thought they might face problems in lack

of equipment" and that "lack of funding/budget was found as the main barrier to integrating technology in education" (p. 392).

Loague et al. (2018) conducted a quantitative student of 47 full-time faculty from the College of Education and College of Liberal Arts and Social Sciences in U.S. higher education institution. A 42-item survey was used to "capture faculty members' attitudes and perceptions of technology use in the classroom" (p. 5). The authors found the top eight technologies being used at the university included the "course management system, desktop apps, presentation apps, Websites, collaboration tools, videos, online tutorials, and recorded lectures" (Loague et al., 2018, p. 8). The authors also found that the university's "faculty perception of the use of technology aligns with the perceptions of faculty on a national and international level" and "faculty agree that the use of technology in the classroom supports learning, but greater support for integrating technology into instruction is needed" (Loague et al., 2018, p. 9). Loague et al. concluded that there is a "need for more assistance in learning new technologies and integrating them into the classroom" (p. 9).

In an examination of literature reviews examining multimedia technologies early in my literature review, the focus of the literature discussions centered around the researchers efforts to better understand the impact of multimedia in education through defining multimedia (Surjono, 2015), considering the nature of multimedia in teaching (Henderson & Thai, 2015), using digital narratives to aid motivation during learning (Fenty & Anderson, 2016), providing meaningful and authentic learning contexts (Admiraal, 2015), adding face-to face interactions in distance education (Palacios &

Wood, 2015; Hegemon, 2015), and using interactive multimedia and eTextbooks as an attention-gaining strategy (Chang & Chen, 2015).

The concept of multimedia was extended to cover interactive learning tools, such as eTextbooks (Chang & Chen, 2015; Lokar, 2015), YouTube (Buzzetto-More, 2015; Martin, Hernan-Losada, & Haya, 2016; Keba et al., 2015; Salas & Moller, 2015; Ferguson et al., 2015; Chiu & Churchill, 2016), virtual worlds, virtual simulations, three-dimensional computer-generated technologies, and ITS (Antonenko et al., 2020; Ayres, 2015; Campbell, 2020; Huang & Liaw, 2018; Khan & Singh, 2015; Paiva et al., 2015; Prestridge, 2017; Salajan, Mount, & Prakki, 2015), and web-based and computer-based technologies using immersive educational games and ITS (Antonenko et al., 2020; Ayres, 2015; Khan & Singh, 2015; Leddo et al., 2018; Salajan et al., 2015; Surjono, 2015; Yeşilyurt et al., 2016).

Also early in my literature review, multimedia research seemed to shift to include more mobile learning research, but included similar themes to include discussions of interactivity and devices like the iPod touch (Campbell, 2020; Jones, 2020; Koohestani et al., 2018; Kraft & Seely, 2015), the motivating factors for using technology (Al-Adwan et al., 2018; Jones, 2020), motivational engagement (DeSantis et al., 2015, Jones, 2020), as lecture tool (Cigdem & Ozturk, 2016), and examining affordances of mobile apps that impact learning (Domingo & Gargante, 2016; Jones, 2020).

In more recent studies, discussions of multimedia have transformed into more general discussions of ICT, including identifying factors affecting teachers' motivations to use ICT (Mirzajani et al., 2016), and the role of teachers' values and technology

integration practices (Nwosu et al., 2018; Vongkulluksn et al., 2018). Much of the ICT

research included studies related to the Technology Acceptance Model (Al-Emran et al.,

2018; Rientes et al., 2016) and efforts to extend TAM to create new models that better

explain teachers' adoption of ICT (Abdullah & Ward, 2016; Solangi et al., 2018; Verma

et al., 2018), examine the available TAM research (Mortenson & Vigden, 2016), develop

a Unified Theory of Acceptance and Use of Technology (Bester, 2016), Theory of

Planned Behavior (Gretter & Yadav, 2018) and develop and extended UTAUT2 model

(Mtebe et al., 2016).

Research related to teachers' beliefs about multimedia often fell into the category

of TPD and included efforts to develop a conceptual framework of preparing teachers for

technology use (Jones & Dexter, 2018; Tondeur et al., 2018), differences between

experienced and novice instructors (Obdillos Dela Rosa, 2016), use of technology in EFL

and CALL studies (Trace et al., 2018), use of educational technology (Shrum & Levin,

2016), open educational resources (Roblyer & Hughes, 2019) pedagogical beliefs (Hsu,

2016), the nature of adult learning (Jones & Dexter, 2018), use of blended learning

approaches (Cloonan & Hayden, 2018), e-Learning strategies (Mesfin et al., 2018),

blending technological and pedagogical perspectives (Bellard, 2018), TPACK (Holland

& Piper, 2016; Reyes et al., 2017; Sherer et al., 2019), 21st Century learning (Shrum &

Levin, 2016; Van Laar et al., 2017), and digital literacy (Hutchison & Beschorder, 2015).

Research in educational technologies often included discussion of student-

centered instruction (Yap et al., 2016), learner autonomy (Lan, 2018); internal and

external barriers of teacher integration of educational technologies (Harrell & Bynum,

2018) differences between instructor and student perceptions of technology (Miner &
Stafaniak, 2018), the nature of digital instructors (Smirnova et al., 2018) the flipped
classroom and barriers to student engagement with technology (Choi & Lee, 2018; Ellis
& Han, 2018; MacKinnon, 2015; Merillat & Scheibmeir, 2016; Sammel et al., 2018;
Tuna et al., 2018), use of web-based instructional materials (Baragash & Al-Samarraie,
2018) teacher barriers to technology integration (Ruggiero & Mong, 2015), and perceived
usefulness of instructor-generated video podcasts (Brodahl & Wathne, 2016).

Literature Review Strategy

I utilized published peer-reviewed journals found through a series of searches
using a combination of keywords that included *online, distance, virtual, or web-based,
and higher education, college, or university, teacher, faculty, instructor, beliefs,
perceptions, information and communication technology (ICT),* and *multimedia*. Multiple
databases were included in the search, to include Education Research Complete,
Academic Search Complete, the Educational Resource Information Center (ERIC), which
were available through school library resources. Searches were restricted to peer-
reviewed journal articles published within the last 2 years. Articles related to current
studies in current educational technology research were frequently found in professional
journals, including *Computers and Education*, *Computers in Human Behavior*, *Journal of
Educational Multimedia and Hypermedia Educational Technology & Society, Journal of
Information Technology Education, British Journal of Educational Technology,
Education Technology Research Development, Journal of Educational Psychology,* and
International Journal of Emerging Technologies in Learning. This process was repeated

on several occasions during the period in which the literature review was conducted to ensure that more recent studies were also included in the study. The studies located through this process helped to identify current trends in related research areas and helped identify the gap in the literature related to instructor perceptions of multimedia that this study has attempted to fill.

Conceptual Framework

Gagne (1985) stated that "when the nature of the instructional situation is known, instructional theory may be brought to bear on the choice of media to assure learning effectiveness" (p. 286). Gagne (1992) used the term media in a broad sense to include "the voice of a teacher or by a printed text" as well as "more complex technical materials, such as sound and video recordings" (p. 205). Reiser and Gagne (1983) defined instructional media as "the physical means by which an instructional message is communicated" (p. 209). Gagne (1985) identified five learning outcomes: intellectual skills, cognitive strategies, verbal information, motor skills, and attitudes, which he divided into two categories in his discussions of selecting media for instruction. Intellectual skills, cognitive strategies, and motor skills make up one set differentiated from the other (attitudes and verbal information) by the need for "precision of feedback" (p. 287) required for the development of the skill identified, stating that "differential requirements of learning outcomes can be matched to media characteristics" (p. 300). In addition, Gagne (1992) recognized that "existing media presentations are *selected* as part of a larger instruction plan rather than being separately *designed* and *developed*" and available media may not be designed for the exact objectives for which it was adopted or

engage in necessary instructional events (p. 205-206). Therefore, it is necessary to create lesson plans that indicate "how the selected materials will be used and the events not presented by the materials are to be accomplished" (p. 207).

Gagne's events of instruction is the conceptual framework for this qualitative study and provides the lens through which my study is conducted. In reviewing the recent literature in online, higher education multimedia, some consistent themes emerged. The literature examined specific types of multimedia and technologies, considered different learning environments and strategies, furthered research in a variety of conceptual and theoretical frameworks in education, reflected common educator concerns, perceptions, and beliefs related to the benefits of multimedia use for learners, and considered the ways that various learning styles and strategies impact the student learning experience. In addition to the themes identified, the study participants were typically students and in some cases librarians or teachers in training. Teachers' perceptions and beliefs were generally inferred by the researchers but actual studies gathering feedback related to teacher experiences and perceptions of technology were not included in the literature reviewed, suggesting a gap in the literature related to teachers' experiences using multimedia during the learning process.

In this basic qualitative research study, I explored teachers' beliefs about the integration and use of multimedia resources in online higher education classrooms. Through interviews with instructors I explored teachers' beliefs of how multimedia impacts student engagement, how it promotes the retention of information presented in the multimedia components, and if the transfer of learning to solving new problems

occurs. Patton (2015) suggested that inherent in the qualitative interview is the assumption that it is possible to capture the experience of others and thereby gain valuable insight into others' perceptions and beliefs. Olafson, Grandy, and Owens (2015) suggested that qualitative studies are ideally suited to understanding teachers' beliefs. Merriam and Tisdell (2016) provided guidance for creating interview questions, conducting interviews, and analyzing qualitative data. And, Rubin and Rubin (2012) discussed the nature of responsive interviewing in research as a means to explore the experiences of others. In this basic qualitative study, I explored the beliefs collected from interviews with teachers regarding their beliefs about the integration of multimedia resources in the online higher education environment.

Literature Review of Key Concepts

This basic qualitative research study considered concepts related to a wide-range of areas of multimedia research, including the TAM, ICT, Unified Theory of Acceptance and Use of Technology (UTAUT), UTAUT2, and General Extended Technology Acceptance Model for e-Learning (GETAMEL), Mobile Learning (m-Learning), Technological Pedagogical and Content Knowledge (TPACK), TPD, Project-Based Learning (PBL), and Mayer's CTML. In addition, the research study considered different multimedia technologies, including eTextbooks, YouTube, virtual simulations and ITS, web-based technologies, and m-Learning. In addition, research frequently focused on essential characteristics attributed to multimedia, including possibilities for student-centered learning, learner self-efficacy and autonomy, interactivity, and motivation. And, 21st Century skills development and digital literacy concepts were examined. The

literature review and conceptual framework for this study yielded a wide array of

keywords (see Table 1).

Table 1

Research Keywords

Concept	Keywords associated with concept
Gagne (Nine events of instruction)	1) Gain attention 2) Inform learner of objective 3) Stimulate recall of relevant prior learning 4) Present the content 5) Provide learning guidance 6) Elicit performance 7) Provide feedback 8) Assess performance 9) Enhance retention and transfer
Information processing model	input, sensory memory, attention, working memory, encoding, retrieval, long-term memory
Communication theory	sender, encoding, message, channel, barriers, noise, decoding, receiver
Kinds of learning	intellectual skills, cognitive strategies, verbal information, attitudes, motor skills
Conditions of learning	internal, external processes involved in learning, perceptions, memory
Theory of reasoned action	attitudinal beliefs, attitude, normative believe, subjective norm, behavioral intention, actual usage
Theory of planned behavior	behavioral beliefs, normative beliefs, control beliefs, attitude, subjective norm, perceived behavioral control, intention, behavior
Original DTPB model	perceived usefulness, perceived ease of use, compatibility, attitide, peer influence, superior influence, subjective norms, self-efficacy, resource facilitating condition, technology facilitating condition, perceived behavioral control, behavioral intention, behavior
Davis's (1986) technology acceptance model	external variable, perceived usefulness, perceived ease of use, attitude towards using, behavioral intention to use, actual use
Dwivedi et al. (2019) UTAUT	performance expectancy, effort expectancy, social influence, facilitating conditions, attitude, behavioral intention, use behavior
Andragogy	self-direct, autonomous, use prior experience as resources, real-life situations, motivated to solve problems and apply learning, strong internal motivators, external motivators can leverage

	individualized instruction, learner styles, learner needs, learner-centered, mastery, 21st Century learning environment, educational technology, affordances, purposeful change, value, usability, adaptability, desirability, comfortability, learning theories, scaffolding, higher order levels of thinking, authentic engagement, independent, flexible, motivation, use technology in meaningful way, engaging and relevant experiences, community of practice, culture, flipped classroom, generative processing, interaction, self-efficacy, formative and summative assessment, engagement, digital age, critical, reflective, metacognition, safe space, practice, curated, confidence, competition, fun,
Misc key words from literature review	choice, flexibility, motivation, hands on, choice, curiosity, collaboration

Research on Teachers' Beliefs

As an introduction to research about teachers' beliefs, I highlight key areas from focused efforts to capture research about teaching, foundations of teachers' beliefs research, the psychology of teachers, and teaching with educational technologies. Gill and Fives (2015) collected research on teachers' beliefs that "fills a necessary gap by identifying the importance of research on teachers' beliefs and providing a comprehensive overview of the topic," dividing the content into six sections: 1) foundations of teachers' beliefs, 2) studying teachers' beliefs, 3) teachers' identity, motivation, and affect, 4) contexts and teachers' beliefs, 5) teachers' beliefs about knowing and teaching within academic domains, and 6) teachers' beliefs about learners.

Anderman and Klassen (2016) examined aspects of "teachers' work as it takes place in the classroom, during the act of instruction," stipulating that teaching is "multidimensional and complex" (p. 796). Fishman and Dede (2016) discussed the

purpose of education in "a landscape shaped by technology that places new demands on schools" that has "broad implications for teachers and the work of teaching" (p. 1269). It is within this context, that the literature review I conducted is framed. While examining the foundations of teachers' beliefs, Skott (2015) provided an overview of the "promises, problems, and prospects of teachers' beliefs," stating that much of educational reform efforts prior to the 1980s "largely ignored the role of the teacher" (p. 14). Skott (2015) pointed out that studies related to teachers' beliefs became a key concern in the decades that followed as "growing numbers of classroom observations and semi-structured interviews were conducted in order to study the acts of teaching, including teachers' thinking as it relates to the profession," (p. 14).

While noting that research acknowledged the need to better understand teachers' beliefs and insights for improving teaching, Skott (2015) indicated that research on teachers' beliefs also often viewed the teacher "as an obstacle to change," (p. 14). In the early 1980s, the constructivist revolution began to reconceptualize learning, shifting the focus of learning to "individual meaning-making" away from teaching models in which the teacher was expected to "present sets of ready-made concepts and procedures for students to copy and follow" (p. 15). Skott claimed that the shift toward an emphasis toward student learning "simultaneously increases the significance of the teacher," since the teacher needs to "assess the students' experiences and pre-understandings," and it is, therefore, "important that the teacher shares the view of the content and its teaching and learning promoted by reform initiatives" (p. 16). According to Skott, research in teachers' beliefs "promised to solve or at least alleviate the problems of implementation as they

relate to a set of reform initiatives that position the teacher centrally in the teaching-learning process" (p. 16). Yet, while beliefs research has "contributed significantly to our understanding of the sense teachers make of their professional tasks and how they contribute to classroom interaction, one may claim that to some extent we still do not know what we are talking about when we talk about beliefs" (p. 19).

While examining the historical overview and theoretical perspectives of research on teachers' beliefs, Ashton (2015) began by noting the lack of references to teachers' beliefs in the first three volumes of *Handbook of Research on Teaching*, suggesting that the dominance of behavioristic theory during the 1940s and 1950s discouraged research on cognitive constructs, such as beliefs (p. 31). Ashton described Getzels and Jackson (1963) chapter on teacher's personality and characteristics' discussion of the Minnesota Teacher Attitude Inventory (MTAI), as clearly based on assessing teachers' beliefs, noting over 60 MTAI studies, but the results raised a great many questions regarding the overall validity of the scores, concluding that there is a "current need to investigate the interactive effect of teachers' beliefs and students' beliefs, needs, and preferences on students' motivation and achievement" (p. 33). According to Ashton, Getzels and Jackson (1963) "lamented the lack of progress made in understanding the relationship between teachers' personality and their teaching effectiveness," citing three problems: 1) lack of an adequate definition of personality, 2) inadequacy of measures, and 3) lack of measures of teacher effectiveness (p. 33). Ashton noted shifting perspectives related to "role of researchers and teacher educators as who provide research-based conclusions for adoption by educational practitioners," suggesting that they "engage teachers in

discussions about teaching and leave the drawing of conclusions for practice to teachers," while indicating that this controversy lingers in current literature on teachers' beliefs (p. 34-35).

Ashton (2015) also described concerns about the distinction between beliefs and knowledge, highlighting Abelson's seven features (1979) distinguishing between knowledge and belief systems: 1) elements of a beliefs system are not consensual but are idiosyncratic and personally derived from experience, 2) belief systems are in part concerned with existence or nonexistence of conceptual entities, 3) belief systems often include representations of alternative worlds, such as the world as it is and the world as it should be, 4) belief systems rely heavily on evaluative and effective components, 5) belief systems include a substantial amount of material derived from personal, cultural, or political views, 6) the content of belief systems is highly open, and 7) beliefs can be held with varying degrees of certitude (p. 36).

Ashton (2015) noted that "we lack sufficient understanding of the nature of beliefs, how they develop, the supports and challenges to them, and how to foster them" (p. 37). Ashton attributed the confusion about teachers' beliefs to a proliferation in psychological constructs, such as attitudes, perceptions, perspectives, and personal theories that all act as aliases for beliefs making it difficult to identify a "clear distinction between knowledge and beliefs" (p. 39). Ashton pointed to the function of teachers beliefs, sixteen characteristics of beliefs, and definition of beliefs, as "an individual's judgment of the truth or falsity of a proposition… that can only be inferred from a collective understanding of what human beings say, intend, and do: thereby offering

"researchers a basis for a more adequate assessment of teachers' beliefs" (p. 39). Ashton concluded by stressing the importance of including teachers in the "process of assessing the ethical implications of research findings to enable them to provide a morally responsible education for their students," suggesting a need for a "strong theoretical- and empirically-validated foundation to the research of teachers beliefs that teachers can use to ground their beliefs" (p. 45).

In a discussion of the development of teachers' beliefs, Levin (2015) began by stating that teachers "hold many different kinds of beliefs simultaneously" also cited a "long list of other terms used interchangeably in literature on teachers' beliefs: attitudes, values, judgments, axioms, opinions, guiding images, ideology, perceptions, conceptions, conceptual systems, dispositions, implicit theories, explicit theories, personal theories, personal practical knowledge, and perspectives" (p. 48). Levin stated that "the lack of cohesion and clear definitions has limited the explanatory and predictive potential of teachers' beliefs" (p. 48). Levin also stated that "more current research acknowledges that teachers' beliefs and teacher knowledge are closely related, especially the practical knowledge that guides their behaviors," while noting that there is "not much research explicitly on the development of teachers' beliefs," asserting that if teachers' beliefs influence their teaching, "then beliefs should be a central concern of teaching and teacher education" (p. 48).

Levin goes on to discuss reasons for studying the development of teachers' beliefs, the characteristics affecting belief development, including sources of teachers' beliefs, the role of context and situativity, and stability of beliefs, and research using

personal practical theories (PPTs) related to the development of beliefs over time, from pre-service candidate teachers to novice teachers to experienced teachers. Levin suggested a personal theorizing process for research studies to help researchers "uncover and make teachers' beliefs explicit and available for study," while also underscoring "the messiness of studying teachers' beliefs" (p. 59). Levin highlighted the proliferation of terms that make the results of research on teachers' beliefs difficult to compare, the different contexts of studies with teachers of different years of experience, the lack of generalizability of study results from small-scale qualitative case studies, limited nature of preservice survey results that do not capture reasons for and sources of teachers' beliefs, lack of longitudinal studies beginning with their preservice teaching experiences through their careers, the lack of diversity among participants in research studies on teachers' beliefs, and lack of a "clearly articulated theoretical or conceptual framework undergirding most studies in teachers' beliefs" (p. 60). Levin concluded that "when teachers are able to articulate and connect their beliefs and practices, they are better able to mentor others, share their perspectives with university-based teacher educators, and provide examples of how practice can inform theory" (p. 61).

In a discussion of the relationship between teachers' beliefs and teachers' practices, Buehl and Beck (2015) also discussed how teachers' beliefs have been defined by researchers with differing emphases on characteristics, such as "implicit or explicit nature, stability, situated or generalized nature, relationship to knowledge" and the function of beliefs (p. 66). Beliefs exist within "a complex, interconnected, and multidimensional system," are "more or less stable or consistent within the individual,"

and are "distinct from knowledge" (Buehl & Beck, 2015, pp. 66-67). The authors

contended that "beliefs may be used by teachers to (1) filter and interpret information, (2)

frame a specific problem or task (e.g., lesson planning), and guide immediate action" (p.

67). Buehl and Beck considered possible relationships between teachers' beliefs and

practices, including how beliefs influence practice, how practice influences beliefs, how

teachers' beliefs can be disconnected from their practices, and the consequences of belief

congruence and incongruence research.

Buehl and Beck (2015) provided a figure highlighting the relationship between

teachers' beliefs and practices in a system of internal and external supports and

hindrances (p. 74) and cautioned that when researchers design research addressing

possible relationships between teachers' beliefs and practices that "careful consideration

must be give to who the teachers are," noting that the "lack of congruence between

beliefs and practices should not be cause to discard the potential of beliefs," but because

teachers beliefs and practices develop over time provide "opportunities to study the

development of teachers' beliefs" (p. 79). The authors concluded that "self-reflection and

discussion of the alignment of beliefs and practices are essential" to enabling teachers to

be "more systematic in improving their own practices" (p. 81).

Anderman and Klassen (2016) described teachers' working lives as "subject to

change through the influence of external factors such as school and social contexts, the

passage of time, and by the nature of teacher-student interactions" (p. 796). The authors

stated that "the ways that teachers carry out the day-to-day tasks of teaching are

influenced by the knowledge they possess, and the beliefs that they hold about the nature

of what constitutes successful teaching" (p. 797) and noted that "research on teachers'

knowledge and beliefs has been conducted for more than 30 years," (pp. 798-799). The

authors discussed the ongoing areas of research in teacher self-efficacy, emotions, and

engagement, teacher-student relationships, with the "emerging focus on teachers'

experiences and emotion in the classroom and changes in those experiences across their

career," suggesting key areas for further research related to a need to "apply emerging

classroom findings to teacher education and professional development practices"

(Andreman & Klassen, 2016, p. 812). The authors identified a need for a "greater

understanding of how to promote change in teachers' beliefs, perceptions, and emotional

functioning in the classroom" (p. 812).

Fishman and Dede (2016) directed the discussions of teaching and technology

toward considerations of "how and under what conditions technology can be productively

employed by teachers to more effectively meet the challenges presented by a rapidly

evolving world" (p. 1269). The authors believed that the "deeper value in technology for

teaching lies in rethinking the enterprise of schooling in ways that unlock powerful

learning opportunities and make better use of resources present in the 21st-century

world," framing their discussion of the "emergence of a possible next-generation

educational model with new roles and responsibilities for teachers" (p. 1269). Fishman

and Dede restricted their use of the term technology to refer to "digital technologies," and

attempted to avoid a techno-centric approach that focus on how a technology helps

student learn more effectively," while developing a socio-technical approach that best

instead examines "what pedagogical approaches best leverage the affordances of these technologies" (p. 1269).

Fishman and Dede (2016) suggested a need for new goals in education to "prepare students for life and work in the 21st century," and highlighted new divisions of labor for teachers as they decide when to use technology in teaching as exemplified in flipping classroom efforts (p. 1270). The authors examined evidence supporting the transformative use of various technologies, to include collaboration tools, online and hybrid educational environments, tools that support learners as makers and creators, immersive interfaces and virtual worlds, and games and simulations (Fishman & Dede, 2016, p. 1276). Fishman and Dede considered learning and pedagogical theories related to how people learn, highlighting four key design lenses for framing teaching and learning environments: 1) the learner-centered lens, that begins instruction with learner preconceptions 2) the knowledge-centered lens which examines what knowledge mastery looks like, 3) the assessment-centered lens that provides opportunities to gain insight in to student thinking to guide learning and instruction, and 4) the community-centered lens that encourages a culture of questioning, respect, and risk taking (p. 1278).

In a discussion of teachers working in an online learning environments, Fishman and Dede (2016) concluded that teachers must have a "solid understanding of pedagogical content knowledge related to their subject to understand what makes different topics easy or difficult for students to grasp, as well as TPACK (Mishra & Koehler, 2006) so that they can use technology effectively to scaffold the individual learning experience of students (Archambault, 2011)" (p. 1291). The authors listed five

"beliefs" held as important by successful online teachers: 1) connecting and establishing relationships with students, 2) practicing and recognizing strategies need to teach online and how they differ from face-to-face instruction, 3) engaging student with content is of utmost importance, 4) actively managing the course is needed to create a positive educational experience for students, and 5) supporting student success to include structuring content to scaffold learning and utilize support structures for students (p. 1291). The authors highlighted a disconnect between the ways that teachers are prepared to teach and the ways that they themselves are taught (p. 1293). Fishman and Dede concluded that "the primary barriers to transforming to a 21st-century educational system are not conceptual, technical or economic, but instead psychological, political, and cultural," and caution against keeping current systems of schooling in place while hoping that "small changes and the introduction of new technologies will make up for their shortcomings," instead making recommendations to implement "technology-enhanced models of education that prepare all students for a future very different from the immediate past" (p. 1321).

As reflective of the introduction to research in teachers' beliefs, I have collected the current literature review of my study about teachers' beliefs about multimedia integration in online higher education into three primary categories: 1) studies examining teachers' beliefs about multimedia integration that are frequently directed toward discussions and research about instructional and communication technologies (ICTs) rather than multimedia specifically and 2) studies examining teachers' beliefs that often relate to TPDs as means to influence and train teachers in effective instructional

practices, and 3) studies related to technology acceptance models that attempt to better understand influences impacting the integration of technology during instruction and learning.

Defining Multimedia in Online Higher Education

My early efforts at research focused on trying to define and understand the nature of multimedia, and are consistent with more recent research related to ICT. Surjono (2015) noted many definitions of multimedia, including "the use of multiple forms of media in a presentation…a combination of text, graphics, animation, pictures, video, and sound to present information in a coherent manner…and the integration of media such as text, sound, graphics, animation, video, imaging into a computer system" (p. 117). Henderson and Thai (2015) considered the nature of multimedia in the teaching of criminal law and procedures, developing something called Crimprof Multipedia, which they used to "engage and educate students" (p. 445). Henderson and Thai provided diverse content that included a wide range of images, video, and animated clips for four stated purposes: "humor, humanizing, headlines, and hypotheticals," (p. 447). Henderson and Thai stated that they believed that multimedia benefitted teaching because it makes the classroom "more enjoyable and effective, breaking the ice with humor and humanizing those affected" (p. 449).

Admiraal (2015) suggested that "Technology can be used to support meaningful learning when technologies engage learners in authentic context" (p. 492). Web-based video, for example, can be used to promote effective teaching and learning strategies, such as peer feedback, increase varied and critical reflection, and develop a more

focused, in-depth, and analytical framework for discussing videotaped practices of others (Admiraal, 2015, p. 493). Fenty and Anderson (2016) discussed the inclusion of digital narratives as a form of multimedia authoring, which "allows students to express their thoughts through images, audio, and music" and results in "increased motivation to engage in classroom content and tasks" (p. 63). Palacios and Wood (2015) argued that "multimedia helps restore the face-to-face interaction in order to compensate for the classroom interactions that distance education lacks" (p. 652).

Hegemon (2015) conducted a quantitative study to examine how instructor-generated video lectures in online courses improve student learning in response to low retention rates in online freshman-level mathematics courses, citing studies that indicated teaching presence is a "strong predictor of student affective learning, motivation and perceived cognition" (p. 73). Hegemon stated that deliberate instructional design techniques "can enhance teaching presence and improve student engagement and persistence"(p. 73). Hegemon concluded that students enrolled in online courses that "strategically place the instructor in the role of content provider performed significantly better on both online and handwritten assessments than did students who enrolled in an online College Algebra course that placed the publisher-generated educational resources in that role" (p. 70).

Chang and Chen (2015) noted that the "use of interactive multimedia materials as an attention-gaining strategy can generate interest and stimulate motivation better than traditional textbooks" (p. 133). Mohammed et al. (2015) stated that electronic books are made of two main components: the device, such as a reader, computer, or PDA, and the

software that displays the content (p. 72). Mohammed et al. provided a variety of reasons for adopting e-books, suggesting that the movement of education institutions towards "using e-learning systems and e-management" increase the accessibility of e-books and "in increasing student motivation to learn and developing academic achievement" (p. 80). Lokar (2015) discussed the future of e-textbooks dividing them into three types: digitalized textbooks that are the same as the printed version with the added value of being able to add comments and notes, rich textbooks that add video and sound elements and perhaps some basic forms of interactive questions, and interactive textbooks that have all of the elements of digitalized and rich textbooks but also provide interactive content, 3D figures and interactive progress checks (p. 103). Lokar also identified a number of drawbacks and disadvantages of current e-textbooks while highlighted their desired characteristics: accessible, adaptable, durable, interoperable, and reusable (p.104). Lokar contended that e-textbooks "should be quite different from printed editions," allowing for "uncomplicated customization and personalization" (p. 105).

When considering available multimedia technologies, YouTube provides a useful example for understanding the varied nature of discussions about multimedia in higher education with discussions ranging from possible uses for the tool to the theoretical and conceptual framework supporting its use and implementation. Buzzetto-More (2015) stated that YouTube has been found to be a "best fit to the characteristics of the Net Generation (student raised since the introduction of the World Wide Web) of digital learners and a valid approach to tap their multiple intelligences and learning styles" (p. 59).YouTube is a video-based recommender system (RS), which makes "use of

similarities that exist between different videos" to drive users to watch other videos on the platform (Martin et al., 2016, p. 9).

Keba et al. (2015) evaluated YouTube and other hosting sites in order to assess "the effectiveness of instructional videos in terms of user experience, student satisfaction, and student understanding" (p. 21). Buzetto-More (2015) suggested that the "use of online video sharing services is most effective when they are used to complement rather than replace lecturer demonstration supporting a hybrid or blended model" (p. 59). In addition, Buzetto-More concluded that "today's digital learners have an affinity for use of multi-media technologies in the instructional process and learn best and fastest when the auditory and visual aspects of their brain is stimulated by multimedia presentations where they can navigate back and forth at their own pace" (p. 69). Buzzetto-More claimed that "targeted YouTube videos enhance the engagement, depth of understanding, and the overall satisfaction of students" and is "particularly effective at enhancing the educational experience of fully online learners" (p. 55). Salas and Moller (2015) examined the use of Voice Thread (VT) in relation to other familiar tools like YouTube in order to "make technology choices that are purposeful and accessible to instructors and learners" (p. 21).

Buzzetto-More (2015) claimed that "YouTube in the instructional process is consistent with the Cognitive Theory of Multimedia Learning which states that video is particularly effective at knowledge construction and memory building" (p. 69). Ferguson et al. (2015) stated that "watching the author lecture on YouTube had significant impact on the sense of community (SoC) among those who read the book" (p. 9) and the "relationship between out of class activities and the creating a SoC is supported in the

research on SoC" (p. 20). In addition. Ferguson et al. found that "whole class discussion was a significant and positive predictor of SoC" (p. 20). Ferguson et al. concluded that "technology and social media can have positive impacts on SoC," which is "supported by an emerging body of literature on SOC, technology, and higher education" (p. 20).

Chiu and Churchill (2016) conducted a quantitative study of 78 senior secondary students in a Hong Kong school to evaluate the effects of multimedia learning principles in interactive learning environments (ILE) in mathematical instruction. Chiu and Churchill used pre-tests to determine prior knowledge and noted no significant differences between the experimental group and the control group. Chiu and Churchill found that the experimental groups performed better than the control group in all measures. In addition, the teaching techniques using variation theory and representations of subject matter, Chiu and Churchill found that the addition of the instructional approach in the experimental group "resulted in higher-order mathematical thinking skills and improved procedural skills" (p. 1355). Chiu and Churchill concluded that "concept learning was simplified when multimedia learning principles were applied and the information was presented by the instructional approach" (p. 1355). Khan and Singh (2015) used computer-based simulations to create a virtual laboratory with the stated purpose of engaging students. Students would be able to "vary a set of parameters to observe the ensuing changes to the simulation output," (p. 3) and creating "independent learning opportunities" (p. 1) for mechanical and manufacturing engineering students.

Prestridge (2017) conducted an in-depth, two-year case study examining three teachers' journey to use game-based techniques in Australia in an effort to develop

insight into teachers' pedagogical orientations for the use of technology. Prestridge stated that teachers' "current uses of technologies still tend to replicate traditional and/or administrative practices, with research indicating that the pedagogies required for effective integration for the effective integration of educational technologies are not yet in evidence amongst the majority of teachers" (p. 367). Prestridge found that teachers' beliefs changed during the implementation phase when teachers reshaped beliefs about technology-enabled learning practices, teachers were low initial technology competency, and teachers initially used to technology to imitate current teaching practices. Prestridge concluded that "understanding how teachers' beliefs evolve and what triggers change in beliefs and their ensuing practices is foundational for administrators and educators at all levels who have a role in supporting teachers' appropriation of technology" (p. 379).

Huang and Liaw (2018) surveyed 308 undergraduates in the Department of Information Management in a university of Science and Technology of central Taiwan in a quantitative study of student learners' attitudes toward the use of virtual reality (VR) learning environments. Huang and Liaw suggested that VR supports real-time simulation in 3D computer graphics and a multisensory interface to mimic the real world and could be "designed to bridge the gap between the theoretical learning in formal instruction provided in traditional classrooms and the real-life application of knowledge in virtual reality environments" (p. 92). Based on the integration of constructivism and TAM as a theoretical and conceptual model, Huang and Liaw examined learner perceptions of "novel learning technologies" and behavioral ITU VR. Huang and Liaw concluded that perceived self-efficacy and perceived interaction are crucial factors affecting perceived

ease of use, perceived usefulness, and learning motivation. Perceived interaction positively affects perceived ease of use and learning motivation. Learner motivation is also a predictor affecting perceived usefulness. In addition, Huang and Liaw concluded that learner attitudes toward and ITU a given technology increase with learner motivation.

Salajan et al. (2015) noted that "interactive 3D learning tools drawing on cognitive and constructivist learning theories have received much attention in recent years in terms of their instructional utility and pedagogical impact," but that the interest in 3D learning tools "has not been accompanied at the same level by empirical research designed to test their impact on teaching and learning" (p. 115). According the Salajan et al., the medical education field "has been at the forefront in the development of 3D atlases or 3D simulations intended to provide students and practitioners with virtual tools that enhance, supplement and, occasionally, supplant physical tactile environments when necessary" (p. 115). Paiva et al. (2015) stated that "the use tutorial videos to support teaching is a technique used for some years," that demonstrated improved assessment results for students who received video instruction instead of text only (p. 230). Ayres (2015) commented that computer-based technology (CBT) "has certain advantages in being able to generate interactions, provide sources of scaffolding in inquiry-based materials, use real-world problems in virtual worlds and provide a platform for immersive educational games" (p. 633).

Yeşilyurt et al. (2016) conducted a quantitative study of 323 prospective teachers to examine correlations between teacher self-efficacy, academic self-efficacy, computer

self-efficacy, and attitude toward applying computer-supported education (p. 591).

Yeşilyurt et al. stated that one of the most commonly accepted definitions of computer-supported education is "transferring the instructional content or activities through computer" (p. 592). Yeşilyurt et al. cited Bandura (1977) in self-efficacy, which "consists of the "regulation of cognitive, social, emotional, and behavioral skills required to perform a task and applying effectively to the situation" (p. 593). Yeşilyurt et al. tested a relational descriptive model in which teacher self-efficacy affects computer self-efficacy, academic self-efficacy, and attitude toward computer-supported education (p. 593). Yeşilyurt et al. concluded that teacher self-efficacy, academic self-efficacy, and computer self-efficacy are "important predictors of prospective teachers' attitudes toward applying computer-supported education" (p. 591).

Leddo et al. (2018) conducted a quantitative evaluation study of interactive, web-based TV programming delivered to sixty-eight 6th grades students in a New Jersey school district. Learners were first given a pre-test to verify that prior mathematical knowledge to ensure that they did not already know the material covered in the television show, then they watched the instructional video, and then learners were given a post-test to see if they could solve problems similar to those in the instructional video. Leddo et al. found that (ITS can play three important roles for students: make the learning process more engaging, provide real world context and application for concepts, and an opportunity to personalize instruction with step-by-step guidance direct to individual needs of the learner.

Khan and Singh (2015) stated that animated models "yielded strong evidence of enhanced understanding being linked to the quality of the visualizations" (p. 3). Salajan et al. (2015) suggested that "3D animations improve visual comprehension of objects featuring complex structures" (p. 115) and "permit users to construct realistic and authentic places, refine rules of the spatial proximity, and overly transform socially the dynamic dimensions in order to improve learning outcomes" (p. 129). Surjono (2015) noted that "motion effect in animation creates illusion of movement which helps to explain abstract concepts" and noted that "computer graphics are effective for gaining attention and can encourage students to create mental images that in turn make it easier for them to learn certain types of information" (p. 117). YouTube, virtual worlds, virtual laboratories, simulations, and 3D aminations are specific forms of computer-enhanced instruction that warrant special attention when considering the evolution of multimedia in today's learning environments.

In a qualitative study, Biddix et al. (2016) surveyed 59 faculty from Korea and the United States to examine faculty beliefs and use of mobile information and communication technology (m-ICT). Findings from this study contribute to growing body of knowledge related to faculty beliefs and use of technology and suggest the need for additional research linking technology use to pedagogy promoting effective use of m-ICT. Kraft and Seely (2015) commented that "Mobile learning has been praised for facilitating "anytime, anywhere" education" and "Mobile devices have also been credited with increasing engagement and information recall, promoting collaboration among

classmates, and increasing students' technological literacy and job preparedness" (p. 222-223).

Koohestani et al. (2018) conducted a qualitative study of mobile learning acceptance using semi-structure, in-depth, face-to-face interviews with 23 students at Iran University of Medical Science. Koohestani et al. (2018) noted that smartphones are "widely used in medical education for different purposes such as a way to access information and references, a guide in rounding, a tool to facilitate and improve learning throughout clinical practicum, and a way to improve problem-based learning" (p. 146). The authors cited TAM research that indicated "TAM explains 46.7% of behavioral intention to use mobile technology or apps for learning purpose in medical students" (p. 148). The authors examined perceived attraction, perceived ease and perceived conflict, which highlighted teachers' contradictory behavioral patterns, noting that while " some of the teachers supported mobile learning, others banned using mobile in classrooms or clinical settings" (p. 155). Koohestani et al. concluded that there is complex interaction of the categories and sub-categories studied that placed students in a dilemma whether to use or not use mobile learning (p. 157).

Al-Adwan et al. (2018) utilized structural equation modeling (SEM) of 228 responses in a quantitative study to model student readiness to adopt m-learning in higher education in Jordan. The authors noted that the advancements in mobile technology, the proliferation of mobile devices, and the availability of the internet have made it increasingly important to examine the factors that influence the behavioral ITU (BEI) m-learning and the readiness to adopt m-learning in today's higher education environment.

The authors examined the following factors: relative advantage (RAD), complexity

(COM), facilitating condition (FCO), perceived enjoyment (PEN), social influence (SIN),

and self-management of learning (SLM), concluding that RAD is a key facilitator, COM

has significant positive influence, SML is a significant obstacle and has a negative effect,

SML is the strongest predictor, FCO is a significant enabler, and SIN is a facilitator of m-

learning adoption. Al-Adwan et al. indicated the implications for m-learning providers

and developers to create "effortless applications that are compatible with students' needs"

and should "pay special attention to the negative impact of self-management of learning

on adoption of m-learning" to uncover resistance to m-learning adoption (p. 235-236).

DeSantis et al. (2015) in their discussion of experiential learning theory (ELT)

suggest that various classroom technologies, including educational gaming, mobile

technologies and web-based learning, make it "easier to differentiate activities among

students, create opportunities for more engaging student experiences, and offer more

choices to students regarding their own learning processes" (p. 43). Cigdem and Ozturk

(2016) discussed the use of multimedia lectures "as a means of distance learning or as a

supplement to conventional in-class learning," noting that the used of multimedia in

education has increased, and "Presenting the course materials through multimedia seems

to have positive effects on learners' satisfaction with the learning environment, which is

likely to promote learners' participation in learning processes" (p. 279). Cigdem and

Ozturk observed "With the development of computer technologies and learning

management systems, constructing multimedia lectures have been easier and

communication tools between instructors and learners have increased" (p. 281). Cigdem

and Ozturk indicated that "Multimedia instruction exerted a direct influence on perceived usefulness and perceived ease of use, which indicated that a system's including instructional multimedia would more probably enable users to think that the system is easy, beneficial, and functional to use for learning purposes" (p. 288).

Throughout the examination of the nature and types of multimedia studied by today's researcher, some common threads emerge. Much of the literature explored the perceived benefits of multimedia. Multimedia is considered useful in gaining and maintaining student attention, increasing learner self-regulation, motivation, satisfaction, and participation, providing learners with more independent control over their own learning with self-paced and interactive tools for improving their own learning experiences (Broadbent et al., 2020; Jones, 2020; Oh & Hong, 2020). Multimedia is considered valuable in its ability to bring often challenging and abstract concepts to life, enabling learners to better visual concepts and create mental models of important ideas. The perceived use of multimedia in the learning process is a common theme in much of the recent literature. The use of virtual worlds, simulations, tutorials, and instructional videos are perceived as beneficial in developing a sense of community and social context with learners actively engaging in the learning process building projects and portfolios. Learner use of mobile devices, tablets, and other multimedia tools provide learners with a sense of connectedness and belonging in today's online learning contexts.

Domingo and Gargante (2016) conducted a quantitative study exploring the use of educational technology and teachers' perceptions of mobile technology learning impacts and use in the classroom. Domingo and Gargante concluded that the two primary impacts

of mobile technologies in the classroom included facilitating access to information and increasing engagement in learning. Domingo and Gargante also noted that the choice of apps was related to teachers' perceptions and have a great impact on their teaching practices. Domingo and Gargante identified the following affordances of mobile apps that significantly impact learning: portability, interactivity, context sensitivity, connectivity, individuality, and social media. Domingo and Gargante identified the intrinsic benefits of sharing knowledge as enabled by mobile technology: self-efficacy and enjoyment, which in turn lead to the five impacts of mobile technology in learning: promoting new ways to learn, increasing engagement in learning, fostering autonomous learning, facilitating access to information, and promoting collaborative learning (p. 23).

ICT

Mirzajani et al. (2016) conducted a qualitative study using field notes and semi-structured interviews of four secondary-school teachers (two male and two female) in Mazandaran, Iran to identify factors that affect teachers' motivation to use ICT. Mirzajani et al. selected personal experience, school environment, and technological factors as variables and identified adequate administrative support, directives to use ICT, ICT skills and knowledge, adequate resources, technical support, and professional development as factors that influenced ICT use. Mirzajani et al. concluded that time, number of students, and professional development of instructors impacted teachers' use of ICT, noting that insufficient technical support and insufficient training discourage teachers' use of ICT.

Nwosu et al. (2018) conducted a quantitative study of 344 questionnaires related to the availability and accessibility of ICT-base instructional tools in selected medical

colleges in Ogun State, Nigeria. Nwosu et al. suggested that ICT-based instructional tools have changed the way that medicine is taught "as both medical science and computer technology have gone under profound enhancement" (p. 393). Nwosu et al. found that "electronic class records, multimedia AV Centers, MP3 playback recording and e-learning are not being used by the lecturers, laboratory technologist and clinical instructors in the medical colleges" (p. 397). Nwosu et al. concluded that availability and access to ICT-based instructional tools in medicine still needs to be improved, recommending that recording lectures for playback, providing e-Learning platforms, and digital libraries for lecturers to enhance instructional tools. In addition, Nwosu et al. recommend medical colleges provide institutional produced educational software be made available on student smartphones and tablets and that medical colleges should provide virtual patients for clinical instruction. (p. 398).

Vongkulluksn et al. (2018) conducted a quantitative study of 624 sixth- to twelfth grade teachers and 20 administrators from 16 schools across a Midwestern state in the United States to examine the role of teachers' value beliefs related to the internalization of external barriers and externalization of personal beliefs for classroom technology integration. Vongkulluksn et al. used Ertmer's Barrier to Technology Integration Model as a conceptual framework to examine first-order and second-order barriers to technology integration in the classroom. First-order barriers are those external to the teacher and include administrator support and expectation of technology integration. Second-order barriers are those that include teachers' value beliefs regarding the importance of technology for learning. Vongkulluksn et al. claimed that teachers' value beliefs had a

direct association with teachers' technology integration practices, claiming that teachers'

value beliefs were stronger predictor of technology than teachers' ability beliefs for

technology use and that teachers' value beliefs also predicted how well teachers

integrated technology. Vongkulluksn et al. concluded that teachers with higher value

beliefs are more likely to use technology for student-centered instruction and for higher-

order, critical thinking tasks. In addition, Vongkulluksn et al. found that teachers' ability

beliefs for using technology for instructive purposes was found to influence how much

teachers incorporated technology in their instruction.

Al-Emran et al. (2018) examined 87 research articles from 2006 to 2018 for

insights into the current trends of TAM research involving M-learning. Al-Emran et al.

found that much of the current research is conducted in humanities and education at

higher education institutions with a significant increase in the last four years in the area

of M-learning. Rientes et al. (2016) examined teachers use of virtual learning

environments (VLEs) in higher education using the TAM to understand teachers'

intentions and actual behavior when implementing information and communication

technology (ICT). Rientes et al. conducted an experimental study with a control group

and identified two factors that "stand out in research on teachers' usage of educational

technology, namely technology acceptance and role of training" (p. 540). Rientes et al.

noted that much TAM research assumed that "the intention to use ICT is directly linked

to actual behavior," and noted differences between teacher preferences in training and

support related to ICT professional development (541). Rientes et al. found that perceived

usefulness was not related to task performance and perceived ease of use was related to

intentions to use technology and actual behavior. In addition, Rientes et al. identified self-efficacy was an important mediator of adaptation to technology (p. 550).

Verma et al. (2018) extended the TAM in a quantitative study of the effects of big data analytics (BDA) systems on the beliefs of the benefits, perceived ease of use, and perceived usefulness, examining the characteristics of BDA systems, the factors impacting adoption, and evaluating the effectiveness of TAM as a theoretical basis for system adoption. In a quantitative study, Verma et al. extended TAM by adding the belief construct of benefits of adoption and adding the external variables of system quality and information quality. Verma et al. concluded that beliefs in the benefits of a technology is a significant predictor of attitude and adoption.

Abdullah and Ward (2016) performed a quantitative meta-analysis of 107 (87 journal articles and 20 conference papers) from the last 10 years of TAM research in e-learning to develop a general extended technology acceptance model for e-learning (GETAMEL). Abdullah and Ward ordered the external factors and ranked the predictors of adoptions from self-efficacy, perceived enjoyment, experience, computer anxiety, to subjective norm. Abdullah and Ward identified the most commonly used external factors to predict adoption of e-learning technologies and ranked the strengths and relationships between external factors and TAM constructs to propose GETAMEL with the external variables effecting perceived usefulness and ease of use, leading to changes in attitude and ITU compared to actual use with the intent that future studies test and validate the model.

Mortenson and Vigden (2016) examined a computational literature review (CLR) software to analyze the content of abstracts to provide a set of research topics within the literature review process. Mortenson and Vigden illustrated the use of the CLR software by reviewing 3,386 articles related to TAM identifying the top twenty TAM articles, publications, and authors ranked by the citation count within the literature review corpus; in effect, analyzing the impact, structure, and content of literature to provide a more systematic approach to mapping available research.

Solangi et al. (2018) proposed a research model extending TAM, investigating barriers to adoption of eLearning solutions, considering training, self-efficacy, compatibility, and facilitating conditions factors and their impact on perceived ease of use and perceived usefulness and impacting behavioral ITU eLearning systems. Solangi at al. found that student self-efficacy, training, compatibility and facilitating condition all positively influenced perceived ease of use of an eLearning system. Solangi et al. concluded that ICT has replaced traditional learning schemes with modern eLearning solutions that provide more flexibility and freedom for students to learn at their own time, but further investigation of critical factors affecting the successful implementation of eLearning is needed, and the proposed research model provided the "holistic view on such barriers to overcome the difficulties in implementing and obtaining optimal benefits from the modern eLearning solutions" (p. 229).

Bester (2016) used the Unified Theory of Acceptance and Use of Technology (UTAUT) as a conceptual framework for integrating multimedia into education. Bester (2016) noted a correlation between levels of ICT integration and teachers' attitudes and

self-efficacy beliefs toward integration as a determining factor to actual integration.

Bester suggested that the integration of multimedia as a learning and teaching tool could

be used to enhance cognitive learning and develop high-level thinking skills, problem

solving, and decision-making. Multimedia, Bester claimed, could provide equal

opportunities for all learners regardless of gender or socioeconomic status and could be

seen "as a way of reforming and transforming education" (p. 37).

Mtebe et al.(2016) examined the factors that affect teachers' acceptance and

prolonged use of developed multimedia-enhanced content using the extended Unified

Theory of Acceptance and Use of Technology (UTAUT2) as a research framework. The

extended framework adds three new constructs of price value, hedonic motivation, and

habit to the UTAUT framework of performance expectancy, effort expectancy, social

influence, and facilitating conditions, which affect behavioral ITU technology and actual

use behavior. Mtebe et al. found that individual perceptions of technology change as

users gain experience, and that the UTAUT2 model accounted for 40.2% of teachers'

acceptance and use of technology, suggesting that additional research is need to identify

other factors that contribute to teachers' acceptance and use of multimedia-enhanced

content (p. 81).

In a quantitative study, Baydas and Goktas (2016) surveyed 2839 preservice

teachers at 16 Turkish state universities to examine of factors influential on preservice

teachers' intentions to use information and communication technology (ICT) in their

future lessons and consider differences related to gender, university, and department.

Findings suggested that preservice teacher training should be subject-specific, but gender

and university did not influence perceived usefulness, perceived ease-of-use and efficacy, social influence, facilitating conditions, anxiety, or intention.

In a qualitative study, Van Den Beemt and Diepstraten (2016) interviewed 18 pre-service teachers of two teacher-training institutes and 18 in-service teachers in the Netherlands within the context of TPD to examine teacher learning ecologies and how they influence teacher ICT use. Findings show the importance of TPD aspects, including social influences over time of types of ICT-use, the importance of informal learning approaches, and the creation of ICT rich social environments.

Gretter and Yadav (2018) conducted an exploratory study of 19 elementary and secondary preservice teachers enrolled in a teacher education in a Midwestern university, aimed at "identifying the direct determinants of preservice teachers' intention to teach media & information literacy in their future classroom" (p. 107). Gretter and Yadav used the theoretical framework of the TPB and qualitative coding of interview data to examine teachers' attitudes, subjective norms and perceived behavioral control related to media and information literacy (MIL). Gretter and Yadav found that most pre-service teachers demonstrated positive attitudes about how student learning could benefit from MIL skills, reported that they used social media every day to gather news or information, but "expressed mixed opinions about the emphasis on media & information literacy education in their teacher education program" (p. 109). Gretter and Yadav also found that preservice teachers "recognized the potential benefits and liabilities of media and information literacy and identified a number of stakeholders and other factors that might influence their willingness to incorporate it into their future work" (p. 112).

TPD

In a quantitative study, Tondeur et al. (2018) surveyed 931 final year pre-service teachers from 20 teacher training institutes in Flanders, Belgium, and conducted a multilevel analysis relating to ICT competencies in the training of pre-service teachers. Tondeur et al. (2018) used the Tondeur et al. (2012) Synthesis of Qualitative Evidence (SQD) model as a conceptual framework for preparing pre-service teachers for technology use, which consists of six strategies: "1) using teacher educators as role models, 2) reflecting on the role of technology in education, 3) learning how to use technology by design, 4) collaboration with peers, 5) scaffolding authentic technology experiences, and 6) continuous feedback" (p. 33). Tondeur et al. (2018) concluded the following:

- Ease of use has positive impact on both types of competencies

- Attitudes toward ICT have a significant impact on pre-service teachers' competencies to develop pupils' ICT use

- Positive relationship between personal computer use and classroom use

- Age and gender had no impact on competencies

- Training should include the development of s supportive environment that "facilitates reflection about the role of new technologies in education and provide opportunities to experiment with new practice in order to further integrate technology in teaching and learning process" (p. 40).

Obillos Dela Rosa (2016) examined the differences between an experienced and a novice instructor in relation to their perceptions, attitudes, and practices related to ICT

use, their overall technological skills, and their experiences with ICT, including professional development, obstacles faced, and types of learning activities used during instruction. The author contended that "the Internet and the rise of computer-mediated communication have reshaped the use of computers for language learning" (Obillos Dela Rosa, 2016, p. 38) and suggested that network-based technology "can contribute significantly to (1) experiential learning; (2) learner motivation; (3) enhanced student achievement; (4) authentic materials for study; (5) greater interaction; (6) individualization; (7) independence from a single source of information; and (8) global understanding" (p. 38). Obillos Dela Rosa suggested that ICT can be used to support innovative pedagogy by "enhancing an already practiced knowledge and introducing new ways of teaching and learning" (p. 43).

Trace et al. (2018) conducted a quantitative study related to how the views of stakeholder groups' views vary on technology in language learning. Participants included 14 directors, 34 instructors, and 100 students in the Language Flagship program in 27 universities in the United States. Trace et al. identified the following CALL research tools used: blogging, course management tools, online gaming, social networking and messaging, synchronous audio/video interaction, and web-based teaching. Trace et al. found that learners rated their technology usage higher than other stakeholders, valuing more interactive forms of technology, such as mobile applications and social networking platforms. Trace et al. suggested that technologies found useful inside of class are more likely to be used outside of class. Trace et al. noted that technology use outside of class is

dependent on pedagogical approach used by instructors inside the classroom, indicating a need for integration of technology based on the needs and experiences of stakeholders.

Shrum and Levin (2016) also suggested uses for educational technologies related to TPD and provided suggestions for school leaders: align experiences with existing pedagogical beliefs and knowledge, provide examples of other teachers' successes emphasizing student outcomes, provide support for risk-taking and experimentation, and expand the definition of good teaching to include technology integration. Shrum and Levin pointed out that managing technological change requires attending to change factors while including collaboration and nurturing partnerships, visioning with all stakeholders, managing technology planning and infrastructure, providing TPD, improving instructional strategies and curriculum, attending to school culture, and keeping abreast of trends.

Cloonan and Hayden (2018) conducted a qualitative responsive case study at Galway-Mayo Institute of Technology (GMIT) in Ireland of the integration of a blended learning approach into a multimedia applications module, working within a conceptual framework of pragmatism or practices driven by what works and constructivist approaches to engaging students. Participants include 40 student in a multimedia applications course in a business information systems program. Data collection methods included personal interviews, questionnaires, and focus groups. Cloonan and Hayden adopted a blended approach that included synchronous online lectures with face-to-face computer labs. The authors found that blended learning increased flexibility and convenience, improved access and use of class content and live recorded online lectures,

created better concentration with fewer distractions, made asking questions easier and less stressful than face-to-face interactions through the use of chat window during live lecture, while face-to-face labs reduced feelings of isolation often associated with online distance education (Cloonan & Hayden, 2018). The authors noted that the "role of the instructor as a facilitator can affect student satisfaction with blended learning" and "suggested that teachers' perceptions and beliefs about educational technology are influenced by what they believe is beneficial to students. Cloonan and Hayden also indicated that "the most important role of an online instructor is to act as an instructional designer" (p. 3594).

Bellard (2018) provided an overview of pedagogical concepts and conceptual frameworks, including blended learning, TPACK, PBL, Merrill's Component Display and Component Design Theories (1983), and learner-centered approaches, as a means for exploring how to "realize the benefits and apply the necessary strategies and practices to reap the various rewards of technology as a tool for complex learning" (p. 20). Bellard provided a framework for achieving complex learning outcomes through the adoption of a pedagogical perspective, offering a model for computer technology delivered instruction. Bellard defined the technology perspective as being associated with computer technology delivered instruction, such as e-learning, self-paced learning, or webinars, and is "valued in its ability to provide access to education and training and to support learner engagement" (p. 6). Pedagogical perspectives, according to Bellard, focus instead on "the learner and provides explanation of relevant factors related to skilled development, learning preferences, how skills and knowledge are acquired and how learning develops

over time" (p. 6). Bellard suggested that teachers adopt a blending of technological and pedagogical perspectives "for how the learning environment should be structured and how education should be delivered for valuable training and effective educational experiences" (p. 6). Bellard also suggested the role of mobile technology as a seamless blending of formal and informal learning.

Holland and Piper (2016) conducted a quantitative study of 90 elementary education majors and 51 secondary education majors to examine the relationships among the 12 constructs in the technology integration education (TIE) model. Holland and Piper used canonical correlation analysis (CCA) to test the relationship among 5 of the 12 constructs: attitudes, subjective norms, perceived behavioral controls, motivation, and TPACK. Holland and Piper found limited correlational relationships between the set of independent variables and the set of dependent TPACK variables. Holland and Piper (2016) concluded that social psychological constructs should be integrated into the teaching of TPACK.

Reyes et al. (2017) conducted a quantitative study using face-to-face interviews with 51 university lecturers who function in the role of unit coordinators in an Australian regional setting regarding integrating ICT into teacher education programs. Reyes et al. (2017) examined the Technological, Pedagogical, and Content Knowledge (TPACK) model to understand the integration of technology and teaching. Reyes et al. concluded that there is a need to harness ICT to contribute to authentic teaching and learning, that technical support must be an integral part of ICT policy implementation, that there is a

need to incorporate just-in-time professional development approaches, and there is a need to carefully consider investments in ICT training with the TPACK model.

Scherer et al. (2018) conducted a quantitative study using 688 Flemish pre-service teacher-training institutions using structural equation modeling (SQM) to examine the importance of attitudes toward technology. Scherer et al. noted that educational and general attitudes matter for TPACK self-belief. Scherer et al. identified a relationship between TPACK and attitudes toward technology or technology knowledge (TK) and concluded that attitudes toward technology and its educational use are important determinants of technology acceptance integration in classrooms. Scherer et al. also claimed that TPACK and attitudes toward ICT are best examined by integrating substantive and methodological perspectives and that stimulating TPACK should be a 21st century goal.

Van Laar et al. (2017) conducted a systematic literature review of academic studies on the relationship between 21st century skills and digital skills. Van Laar et al, stated that ICTs are at the core of a fast-changing knowledge economy and made distinctions between technological skills concepts, 21st century skills concepts, and 21st century digital skills concepts. Van Laar et al. provided a framework for 21st century digital skills with conceptual dimensions and key operational components, identifying seven core skills: technical, information management, communication, collaboration, creativity, critical thinking, and problem solving. In addition, Van Laar et al. identified five contextual skills: ethical awareness, cultural awareness, flexibility, self-direction, and lifelong learning.

Shrum and Levin (2016) examined educational technologies and 21st century leadership for learning research, providing suggestions related to integrating technology and pedagogy to improve student outcomes and engagement, prepare learners for the future and support teachers in adopting new pedagogies for teaching and learning. Shrum and Levin highlighted the Speak Up student (2011) and its three E's for education: enabling, engaging, and empowering, which guided the use of educational technologies for creating greater richness in the student learning experience. Shrum and Levin suggested that enhanced use of technology has impacted instruction leading to more interaction between teachers and students and creating more student-centered interactions, that digital technologies have enabled greater collaboration opportunities, and identified eight attributes need for educational technology to reach full potential: support teachers and students, create choices in how to learn, create time for writing and reflecting, support opportunities to innovate, encouraged the asking of questions, created problem solving opportunities, enabled self-assessment, and encouraged collaboration.

Schrum and Levin (2016) provided and overview of educational technologies and the concept of 21st Century learning, highlighting a wide-variety of innovations "grounded in the use of technology in teaching, learning and leading" (p. 36). Schrum and Levin presented the three E's for education: enabling, engaging, and empowering, and addressed teachers' beliefs about technology. Schrum and Levin concluded that addressing teachers' beliefs about technology should be part of the process when integrating new technologies into schools and identified eight attributes needed to successfully integrate technologies into learning: support teachers and students to learn to

use their voices, be offered choices on how to learn, have time for writing and reflection, be supported with opportunities to innovate, be encouraged to ask questions and think critically, be problem finders and problem solvers (PBL), learn how to self-assess, and be encouraged to connect with others. Schrum and Levin suggested that when planning professional development that school leaders should: align experiences with existing pedagogical beliefs and knowledge, provide examples for teachers' successes emphasizing student outcomes, and expand the definition of good teaching to include technology integration. In addition, Schrum and Levin concluded that managing technological change requires attending to change factors while including collaborative and nurturing partnerships, visioning with all stakeholders, managing technology planning and infrastructure, providing professional development, improving instructional strategies and curriculum, attending to school culture, and keeping abreast of trends.

Yap et al. (2016) conducted a quantitative study using Weimer's Learner-Centered Teaching Model as a guide to the development of a learning environment which multimedia-mediated learning modules. Study participants included 68 students in INTI International University's Diploma of Business Administration program to consider the role of the teacher, balance of power, function of content, responsibility for learning, and process and purpose of evaluation in the use of multimedia. According to Yap et al., the goal of multimedia use in learning should be to transform the conventional teaching environment to a more learner-centered one that positively impacts student outcomes. The use of technology should be interactive and focus on engaging and motivating student-centered learning.

Lan (2018) provided an overview of the concepts of learner autonomy, highlighting the shift to learner-centered approaches and the nature of autonomous learners as independent, responsible, proactive, motivated, and willing to take risks during the learning process. Lan pointed out that the "adoption of advanced technologies in education brings new opportunities for providing learners with brand-new learning experiences" (p. 859). Despite the potential applications of advanced technologies in learning, Lan warned that "challenges are inevitable because simply be introducing advanced technologies to educational settings cannot guarantee effective and autonomous learning" (p. 860). Lan claimed that it is, however, worth the effort of researchers and teachers to investigate efforts to create autonomous learning using digital resources and student generated technological artifacts.

Harrell and Bynum (2018) examined the factors affecting technology integration in classrooms, highlighting both "external and internal factors that affect the proper implementation of technology in classrooms" (p. 12). External factors limiting technology integration include poor infrastructure, citing the need for "strong Wi-Fi signal that assures student of anywhere anytime connectivity," inadequate technology due to limited funds and school budgets with an ongoing need to "bridge the gap between utilization and adequate resources," lack of sufficient and effective professional development, noting that "simply providing teachers with professional development opportunities related to using technology does not translate into higher levels of integration in the classroom" (Harrell & Bynum, 2018, pp. 13-14). According to Harrell and Bynum, technology integration was "the second most common topic for professional

development" (p. 14). Internal factors limiting technology integration include low self-efficacy, which has a "significant correlation to teacher's use of technology in the classroom" and teachers' perceptions, which is "consistent with other research that found teacher's readiness, or lack thereof, had the highest total effect on whether teachers integrated technology in their classrooms" and teacher's negative perceptions "due to the amount of time it takes to integrate into the curriculum through additional training and planning" (p. 15). Harrell and Bynum suggested that teachers' self-efficacy plays a significant role in the desire to integrate technology in the classroom, and that school administrations need to provide appropriate infrastructure, network bandwidth, and sufficient devices for classroom use, as well as provide sufficient professional development opportunities to overcome teachers' perceived barriers to educational technology integration (p. 16).

Miner and Stafaniak (2018) conducted a qualitative study using a grounded theory approach to explore instructor and student perceptual differences related to learning via video in higher education. Participants included 16 instructors and 37 students at a mid-Atlantic university in the United States. Data collection methods included surveys with open-ended questions. Miner and Stafaniak found that laptops were the preferred device for viewing multimedia and that on-demand, internet ready access was perceived as valuable and advantageous for learning. Miner and Stafaniak identified two distinct categories of video: those created to deliver information for passive collection of factions and comprehension of ideas and those designed as distinct problem-solving and sequential-step "how-to" explanations. Miner and Stafaniak

concluded that "both instructors and students perceived multimedia video to be a viable teaching resource to communicate course content" (p. 11). In addition, Miner and Stafaniak highlighted the potential positive impact of the use multimedia video on learner behavior when "managed by an involved instructor who is sufficiently skilled in its application" (p. 11).

Smirnova et al. (2018) conducted a mixed-methods study with 32 teachers using a web-based survey, unstructured interviews, surveys, and observations related to "transforming learning and teaching with digital pedagogy." Smirnova et al. identified what they termed "experience effect," suggesting that digital instructors become and stay active seekers of new knowledge and absorb new techniques for enhancing student learning. Smirnova et al. found that levels of prior knowledge and technology related skills were essential predictors of designing technology infused curriculum, concluding that learning and motivation grow significantly as teachers connect, engage, and collaborate with other tech savvy teachers and experts in the field. In addition, Smirnova et al. concluded that a digital pedagogy lends itself to constructivist values and that a changing technology pedagogy also created changes in assessment, noting that the nature and process of assessment moved away from assessment of final outcomes toward the learning process itself, its authenticity, and the extent of student engagement, requiring the need for constant feedback from instructors.

In a case study of an introductory psychology classroom, Tuna et al. (2018) evaluate the flipped classroom approach in which the instructor makes a lecture video available to students prior to the class meeting, in which the instructor used class time for

discussion and student questions. Tuna et al. examined the flipped classroom model by assessing student perceptions of the instructional model, teaching and course evaluation, instructor satisfaction, student performance, and video usage analytics (p. 529). Flipped learning is characterized by moving direct instruction from the group learning space to the student learning space (p. 530). Tuna et al. contended that the flipped classroom model is supported by several pedagogical theories, including Blooms Taxonomy, since "higher order tasks such as Applying, Analyzing, Evaluating, and Creating are done in the classroom in the presence of the instructor and peers" (p. 530).

In a quantitative study, Choi and Lee (2018) examined the effects of a flipped classroom in a technology integration course for pre-service teachers, finding that the flipped classroom participants performed significantly better than the control group (p. 3). In the flipped classroom, pre-service teachers reviewed an e-book lesson prior to a face-to-face class in which they participated in interactive learning activities, while the control group engaged in traditional computer lab instruction. Choi and Lee found that pre-service teacher perceptions of the flipped classroom were positive among the experimental group. Choi and Lee concluded that the flipped classroom instructional model is an effective one for technology integration in teacher education, suggesting that the flipped classroom is an instructional paradigm, the flipped classroom concerns not only a flipped way of instruction but also students, technology and the whole learning process" (p. 11).

MacKinnon (2015) assessed qualitative and quantitative measures of intern reactions to a flipped classroom approach within a constructivist framework. MacKinnon

defined flipped learning as " a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter" (p. 44). The author cited flipped classroom research regarding the positive potential benefits of the flipped classroom, namely "students define learning pace, scaffolding of homework in the classroom allows for teacher as diagnostician, content is customizable for students, classroom time is more efficient and engaging, teachers report improved student motivation, it is consistent with current pedagogical trends, and technology as a tool is a natural fit" (MacKinnon, 2015, p. 45). The author noted that "praise has been balanced with critiques that (a) no significant different in student performance has been demonstrated, (b) students might be unprepared or unwilling to do the necessary preliminary work, (c) the teacher has a significant task to orchestrate and coordinate materials access and activities, and (d) the format may diminish opportunities for a Socratic approach to teaching" (MacKinnon, 2015, pp. 45-46). MacKinnon concluded that the "ultimate aim will be to identify those categories of resource intervention that demonstrate a tangible improvement in the conceptual understanding on the student's part" (p. 52).

Sammel et al. (2018) used a sociocultural theoretical framework for their qualitative study of flipped classrooms. The authors surveyed 79 pre-service teachers regarding their use of online videos that while the videos were defined as mandatory, only one of the student teachers watched all of the required videos, nine did not watch

any, and the majority only watched four of the eight assigned videos. The authors noted

that the use of technology can create a more individualized and self-paced learning

experience. Sammel et al. identified necessary conditions for an effective flipped

classroom implementation to include the need to engage in teacher professional

development, identify key concepts necessary to focus weekly online videos, develop

course profiles to clearly identify flipped classroom expectations, deconstruct the roles of

teacher and student while also making a case for the flipped classroom approach,

provided clear examples of how students can deepen understanding and better engage

online resources and encourage a more collaborative learning environment, provide

weekly quizzes to promote engagement and check for knowledge and understanding, and

actively promote the use of an interactive discussion forum engagement prior to face-to-

face classroom meetings. Sammel et al. claimed the key barrier to student engagement

and enjoyment is a mismatch of student expectations and assumptions of what constitutes

a good learning experience. Sammel et al. concluded that student teachers did not fully

understand how a flipped classroom approach was designed to complement classroom

interactions.

Ellis and Han (2018) examined the extent of engagement and academic success as

a constituent part of university learning experiences through a quantitative exploratory

factor analysis of questionnaires given to 201 engineering students at a large metropolitan

Australian research-intensive university. In addition, Ellis and Han examined the

academic performance and digital footprint of learners as measured by teachers' use of

formative and summative feedback. Through the conceptual framework of Student

Approaches to Learning (SAL), Ellis and Han found that students may avoid the online

learning environment in blended courses because of preferences for working face-to-face

with classmates, the perception that the online part of the course is unrelated to or

integrated with the course, not recognizing the value of reviewing the online

contributions made by other students, and perception that the online part of the course

creates too much workload. Therefore, Ellis and Han suggested that when teachers and

instructional designers make course design decisions and develop online instruction, their

aim should be to help the student understand the significance and importance of the

online environment, design the curriculum and experience to make the online

environment and essential part of the student experience, make the use of student

submissions relevant to stimulate ideas and peer learning, and provide a clear

understanding of why the online environment is part of the overall learning strategy.

According to Ellis and Han, SAL suggests that student perceptions of learning, their

engagement in courses, and the choices they may in their approach to learning are

logically and positively related to student perceptions of teachers, teaching quality, clear

goals and objectives, workload, and generic skills.

　　　　Merillat and Scheibmeir (2016) examined the impact of a faculty enrichment

program related to technology for nursing faculty in a School of Nursing in a medium-

sized Midwestern university. The authors identified four chief outcomes from the faculty

enrichment program, "increased use and efficacy of technology for professional and

educational purposes, improved implementation of teaching & learning best practices,

increased evidence of scholarship among faculty members, increased evidence of

advance nursing concepts and innovation among faculty members" (Merillat, Scheibmeir,

2016, p. 161). Merillat and Scheibmeir conducted a quantitative study of 61 face-to-face

and 7 online or practicum courses of 27 different full or part-time faculty. Merillat and

Scheibmeir concluded that professional development should ensure that all faculty are

adequately trained in the learning management system and should "emphasize the

effective use of technology in the classroom, and not simply the use of technology" (p.

169).

Baragash and Al-Samarraie (2018) conducted a quantitative study of 196

undergraduate students from universities in developing countries to examine student

engagement and the impact of learning management system (LMS) tools on student

performance in blended courses. Baragash and Al-Samarraie used online surveys posted

by 17 instructors in the learning management systems to examine the differences in

student perceptions and preferences for mode of learning and engagement with the online

learning environment. Baragash and Al-Samarraie examined the effects of face-to-face

(F2F), LMS, and web-based learning (WBL) on student learning performance,

concluding that student participation in online homework and quizzes can improve

student performance, that online quizzes were positively impacted if students used web

materials, and the use of web-based learning were significant indicators of final exam

performance. Baragash and Al-Samarraie concluded that F2F learning mode influences

student completion of online assignments, which has implications for instruction in a

blended learning environment.

In a quantitative study, Gil-Flores et al. (2017) randomly selected 3339 teachers from 192 schools to study the role of school information and communication (ICT) infrastructure and teacher characteristics to explain ICT use in education. Findings indicated that ICT use is limited by training needs of teachers and low levels of teacher collaboration, and professional development needs is significant variable in explaining ICT use.

In a qualitative study, Sadaf and Johnson (2017) surveyed 50 in-service teachers and conducted six semi-structure interviews, to explore teachers' behavioral, normative, and control beliefs related to digital literacy integration into their classrooms. Findings indicated that teachers' integration of digital literacy were related to their behavioral beliefs about the value of digital literacy as it developed student skills, increased student engagement, and prepared students for future careers, normative beliefs related to meeting expectations of administrators, parents, colleagues, and students, and control beliefs related to the ease of integrating digital literacy due to technology access, professional development, and curriculum resources.

In a mixed-methods case study conducted in seven exemplary schools across the United States, McKnight, O'Malley, Ruzic, Horsley, Franey, and Bassett (2016) examined digital instructional strategies that teachers use to enhance and transform student learning, conducting focus groups and interviews, observing classrooms, and surveying teachers. Findings emphasized the need for attention on supportive leadership, ongoing, teacher-driven professional development, and technology infrastructure.

Ruggiero and Mong (2015) identified four themes regarding in-service teacher training: "1) defining technology integration as a process, 2) design as a tool of technology, 3) use technology in primary, middle, and secondary classroom is seen as pervasive, 4) value of technology integration in the classroom is constantly changing" (p. 168). Ruggiero and Mong recommended restructuring professional development to include contextualizing technology integration in the classroom, identifying three factors related to technology integration: hardware and software, teacher training, and professional support.

Brodahl and Wathne (2016) surveyed 14 in-service teachers in a qualitative study to identify teachers' perceptions of the design and quality of mathematics videos in their online learning. Brodahl and Wathne used Mayer's CTML as a conceptual framework and found that keeping video podcasts at a minimal length, avoiding dialectical words or phrases that may differ from the viewers', avoiding reading exactly what is written on the screen, and narrating in a serious but friendly voice impacted viewers' perceptions. Brodahl and Wathne identified the critical conditions as efficiency, enjoyment, and concentration in learner perceptions of perceived usefulness of videos in online learning. Brodahl and Wathne concluded that perceived usefulness of videos impacted the student learning process with implication for instructional design of video podcasts and design principles related to e-learning and multimedia instruction.

Summary and Conclusions

Throughout the literature review, a focus on the nature of multimedia integration and teachers' beliefs, consistent themes emerged regarding multimedia use. First,

throughout the history of video-based learning is the belief that multimedia and online learning continues to advance, as the focus on attention-gaining and motivational strategies, authentic learning, and creating a unique self-directed and self-paced learning experience for students emerged as common factors for selecting and developing multimedia resources (Buzetto-More, 2015). Creating a collaborative eLearning experience also emerged as a goal for multimedia integration (Ferguson et al., 2015). Virtual learning environments and simulations were frequently examined with the underlying belief that these tools may be used create opportunities to repeat and practice through structured guidance, increase motivation, and provide authentic realistic experiences (Khan & Singh, 2015; Salajan et al., 2015).

In much of the literature on teachers' beliefs of ICT integration has shifted from replicating traditional instructional practices to transforming teachers' beliefs and recognizing how those beliefs evolve during the implementation of technology in instruction to include more technology-enabled learning practices (Prestridge, 2017). In addition, internal and external barriers impact teachers' integration practices (Harrell & Bynum, 2018), including administrator support and expectations and teachers' values beliefs regarding the importance of technology for learning (Solangi et al., 2018; Vongkulluksn et al., 2018). Teacher professional development of ICT competence and training activities are examined in research studies to identify essential characteristics needed to ensure more effective teacher integration practices (Rientes et al., 2016). Also, research in the area of TAM often attempted to extend TAM to better explain teachers' ICT integration practices (Abdullah & Ward. 2016). In my own study, I hope to

contribute to a growing body of literature in teachers' beliefs about multimedia resources, online learning, and teachers' beliefs about technology integration of multimedia in online higher education environments.

In Chapter 3, I describe the research design and rationale for my participant selection as well as the methodology used to conduct this study. I also address issues of trustworthiness related to credibility, transferability, dependability, and confirmability, as well as a detailed description of ethical procedures.

Chapter 3: Research Method

Introduction

The purpose of this basic qualitative study was to explore the benefits and challenges higher education online teachers experience when integrating multimedia resources into their courses. A basic qualitative design was selected to explore teachers' beliefs regarding the challenges and benefits of multimedia resources as it influences selection, integration, and use of multimedia resources (see Merriam & Tisdell, 2016). An interview strategy was chosen to gain insight into teachers' experiences and how those experiences influence their beliefs regarding teacher professional development, social contexts, and pedagogical beliefs, intentions to use educational technologies, and intentions to integrate multimedia resources into instruction (see Merriam & Tisdell, 2016; Olafson et al., 2015; Ravitch & Carl, 2016; Rubin & Rubin, 2015; Seidman, 2019).

This chapter focuses on the research method used to conduct this basic qualitative study, including information related to the research design and rationale, the role of the researcher, participant selection, research instrumentation, procedures for recruitment, participation, data collection, and the data analysis plan. I examined issues of trustworthiness, credibility, transferability, dependability, and confirmability inherent in my study, as well as provided ethical procedures used during data collection and analysis. This chapter concludes with a summary of the qualitative research study design.

Research Design and Rationale

The central question of my basic qualitative research study was as follows: What are the beliefs of higher education online teachers regarding the benefits and challenges

they experience when integrating multimedia resources into higher education courses? I explored how higher education online instructors describe their experiences and attach meaning to those experiences as they select, integrate, and use online multimedia in their courses. Roblyer and Hughes (2019), Huang et al. (2019), King (2017), Spector (2016), and Clark and Mayer (2016) provided a framework for understanding educational technology and multimedia integration into online learning environments. Additionally, Merriam and Baumgartner (2020), Gill and Fives (2015), Ertmer et al. (2015), and Shraw and Olfson (2015) provided a framework for understanding teachers' beliefs and the use of educational technologies in adult higher education online learning environments. Moreover, Gagne et al. (2005) provided the conceptual framework for my study with an instructional and pedagogical approach to the use of multimedia. Finally, Davis (1989) provided guidance through TAM for predicting and explaining information technology use by users, to include perceived usefulness and perceived ease of use.

Qualitative research today "encompasses a number of philosophical orientations and approaches" and places "an emphasis on experience, understanding, and meaning-making" (Merriam & Tisdell, 2016, pp. 19-21). Qualitative research designs include basic qualitative research, phenomenology, ethnography, grounded theory, narrative inquiry, and case studies (Merriam & Tisdell, 2016). According to Merriam and Tisdell (2016), the philosophy of phenomenology underlies qualitative research, attempting to provide the essence of experience and has influenced the practice of researchers examining their assumptions and biases. Ethnography emphasizes a shared cultural experience. Grounded theory focuses on building a theory and is "particularly useful for

addressing questions about process; that is, how something changes over time" (Merriam & Tisdell, 2016). Narrative inquiry emphasizes storytelling and shared experience. Case studies are in-depth descriptions and analysis of a bounded system (Merriam & Tisdell, 2016).

The overarching goal of my study was to explore teachers' beliefs through interviewing them in various settings both public and private, rather than conduct a bounded case study at a single institution. Also, I did not attempt to develop a theory regarding teachers' beliefs, provide a narrative about shared beliefs, or explore a phenomenon or cultural experience regarding multimedia integration in online higher education. After considering the nature of each qualitative study design, I selected a basic qualitative research design as best suited to my research question, data collection methodology, and scope of my study.

Merriam and Tisdell (2016) claimed that qualitative research is founded upon the belief of knowledge construction and meaning making, contending that basic qualitative studies are the common in education research. The authors emphasized choosing a study design that corresponds to the research question. The authors also noted that interviewing is needed when the researcher cannor observe participant beliefs, feelings or interpretations of their experiences. When considering the differences between the subjects of inquiry in natural sciences and social sciences, Seidman (2019) pointed out that the subjects of inquiry in social sciences research participants can use language to provide insight into their experiences, so interviewing provides a means for asking the questions that the researcher is interested in understanding better. Seidman also suggested

that the primary way to learn about an educational organization is through interviewing members of the organization. In addition to aiding me in identifying the research design for my study, Seidman and Merriam and Tisdell provided guidance for using interviewing as a data collection technique, the role of the researcher, understanding the nature of interviewing as a research tool, and creating suitable interview questions that would enable me to address the research question.

Qualitative research has a long tradition in education and is ideally suited to gaining insight into teachers' beliefs (Olafson et al., 2015; Ravitch & Carl, 2016). Aligning method of inquiry with research questions, selecting appropriate data collection methods, and analyzing qualitative data are essential to designing research studies (Creswell & Poth, 2018; Merriam & Tisdell, 2016; Patton, 2015; Seidman, 2019). Qualitative interviewing is intended to capture the experiences and provide meaningful perspectives of study participants (Merriam & Tisdell, 2016; Olafson et al., 2015; Patton, 2015; Rubin & Rubin, 2015). Responsive interviewing can provide an opportunity to explore experiences, motives, and opinions of others in their natural settings to contextualize and reflect on those experiences (Merriam & Tisdell, 2016; Ravitch & Carl, 2016: Rubin & Rubin, 2012). Thus, the basic qualitative study design was selected because it is ideally suited to providing the necessary insights from teachers regarding their beliefs about the barriers and challenges with the multimedia integration in adult learning in online higher education.

Role of Researcher

My role as the researcher in this study included directing study participants to complete the preinterview survey, interviewing teachers, and collecting and analyzing data. Because I was the primary collector of data and responsible for analyzing data, I have reflected on a variety of personal and professional experiences and beliefs that might bias the collection and analysis of interview results. Seidman (2019) suggested that a researcher should "identify the autobiographical roots of their interest in their topic" so that they can "minimize the distortion such interest can cause" but also affirm "a real desire to know what is going on, to understand the experience" (pp. 36-37). Seidman emphasized that interviewing is a meaning-making experience, and that the role of the researcher in qualitative interview research is to ask real questions to which the researcher does not have the answers. There is an "inherent paradox at the heart of the issue of what topics researchers choose to study" (Seidman, 2019, p. 37). The researcher must have a real interest in the research problem and question, but must also "approach their interests with a certain sense of naiveté, innocence, and absence of prejudgments" (Seidman, 2019, p. 37). An interviewer must both understand the complexities of a subject and recognize the limitations of their own understanding (Seidman, 2019).

I have been a teacher for much of my adult life, having taught at secondary and higher educational levels, in private and public school settings, and in residential, online, and blended learning contexts. I have managed teachers in online higher education and have an interest in teacher professional development, having developed and conducted a variety of targeted technology-related and distance education in-services. I have been a

project manager for a variety of technology integrations and have a specific interest in the integration and implementation of technologies in online learning management systems.

As a teacher, I used technology during instruction and faced my own challenges when seeking ways to effectively integrate educational resources in the teaching and learning processes. As a higher education online administrator, I have expectations for the integration and use of educational technologies in online learning management systems. As an educational technologist, I am in a unique position to observe a variety of responses to technology integrations in teaching and learning. While all of these are true, I believe it is important to listen to the experiences of others in order to make informed decisions about needed changes. In my experience, I have learned that my experiences are not typical ones and that the integration of technology in teaching and learning processes have a wide variety of responses from teachers who hold a vast array of conceptions and expectations about technology use in their classrooms.

In order to minimize ethical concerns regarding personal and professional relationships with study participants, the teachers included in this study were selected from locations with which I have had minimal or no contact prior to the research study, preferring to interview participants with whom I had not prior connections either personally or professionally. This participant selection process was chosen to minimize any researcher biases and avoid potential power relationship concerns. One of my most important roles as a researcher was to create a rapport with study participants such that they feel secure enough to openly and willingly share with me their beliefs about multimedia integration in their teaching and learning experiences.

Methodology

Participation Selection Logic

The target population was online higher education teachers in private colleges in the western United States. I used purposeful, convenience sampling to identify participants by contacting local school administrators who could refer possible candidates who meet the participant requirements (see Merriam & Tisdell, 2016). I conducted three rounds of interviews with available participants from the end of July 2021 to early January of 2022. The number of participants selected was an approximation designed to address issues of sufficiency and saturation, but the participation selection process allowed for the inclusion of additional participants if needed. The initial interview of 10 participants included teachers from a variety of private schools with varying backgrounds and levels of experience integrating multimedia. The same participants participated in a second round of interviews to provide additional depth and insights. The final round of interviews was used for follow up questions and member checking. This interview strategy provided sufficient and detailed enough responses to gain some valuable insight into teachers' beliefs about the benefits and challenges when integrating multimedia in online higher education. In-depth interviews enabled me to better understand those factors that influence the acceptance and adoption of educational technologies.

Instrumentation

Merriam and Tisdell (2016) suggested nonprobability sampling for qualitative research, noting that purposeful and theoretical sampling are widely used nonprobability sampling strategies. I used purposeful sampling of teachers in private school settings as

my selected interview strategy. Purposeful sampling uses criterion-based sampling, which for my study required that study participants be online teachers in higher education who were involved in the multimedia selection processes and had experience integrating multimedia in their classes (see Merriam & Tisdell, 2016). Purposeful sampling, including convenience, snowball, and chain sampling, is intended to identify participants who will be able to provide information-rich examples that address the research question. I selected participants using convenience sampling from schools in my area of the western United States, among the private colleges available.

Seidman (2019) identified two criteria for determining when a researcher has interviewed enough participants: sufficiency and saturation. Sufficiency refers to such characteristics as the numbers of participants and sites that make up the study. Because my study was not intended to be a case study of teachers from one type of institution, I attempted to find participants from more than one school and type of institution who met the criteria identified; seeking participants from only one school or type of school would have limited the participant pool and would not have adequately addressed the central question of teachers' beliefs. In addition, I considered participant characteristics, such as age, gender, years teaching, and overall technical experience from novices to experts, attempting to gather participants who represent a wide range of characteristics.

According to Merriam and Tisdell (2016), reaching a point of saturation, or redundancy, in interviewing occurs when the researcher begins hears the same responses from participants. However, it is sometimes difficult to know when saturation may be reached, suggesting the value of engaging in analyses while collecting data. The authors

pointed out that asking good, open-ended questions is essential to effective interviewing. In addition, Seidman (2019) highlighted the importance of planning and preparation prior to conducting interviews. I used open-ended questions to maximize the information provided by teacher participants and to identify thematic beliefs of online higher education teachers about multimedia integration in their online classes.

I used a preinterview survey to identify teachers with experience integrating multimedia in their online classrooms and sought permission to contact and arrange individual participant interviews. Given the current Covid-19 circumstances, all meetings occurred in an online virtual meeting rather than on-site at a private school. I distributed preinterview surveys during the initial meeting through email with a description of the study and the data collection process. The email request for participants included the purpose of the study, the study procedures, the voluntary nature of the study, information about me as the researcher with my contact information, and statements regarding the confidentiality of interview participant information and responses.

I conducted interviews using an online virtual meeting tool that allowed me and the teacher participant to talk with each other. Interview questions have been aligned to my research question as identified in the informed consent document agreed to by participants. I recorded interviews with participant permission so that precision and integrity of the responses could be maintained. I disabled the camera to aid in participant confidentiality during the online recording so that only the verbal responses of participants were recorded. The interviews arrangements included the time, length, and interview conditions. I limited each interview to 1 hour at a prearranged date and time

convenient to the participant but within the timeframe needed to conduct each round of the interview study in a timely fashion.

I conducted the initial round of interviews with the 10 participants of this study to gain insight from the set of research questions created for the study. Participants consisted of teachers with varied experiences integrating multimedia into online higher education classrooms. I was able to identify instructors who experienced greater challenges while integrating multimedia in their online classrooms and those who had identified the benefits of multimedia integration, which was central to addressing the research question. I anticipated that some participants would have more lengthy and detailed responses than others, so to be able to gather responses to each of the study questions, follow up interviews were necessary to collect additional details and insights into the interview questions.

I used the second round of interviews to continue first round interviews that warranted additional time, but I asked more focused questions of participants who shared their insights about the benefits and challenges of multimedia integration and gathered additional thoughts not shared during the first interview. I used the final round of interviews for member checking and to seek clarification to earlier responses using probing questions and to seek additional thoughts related to the challenges and benefits of integrating multimedia in online higher education classrooms, in the event that saturation had not been reached. Each round of interviews lasted approximately 1 hour. Interview schedules were dependent on participant availability, but in order to maintain interest in the research, I conducted each round of interviews with a single participant within

approximately 1 week of each other, whenever possible. I continued to seek additional participants on standby in the event that saturation had not been reached (see Merriam & Tisdell, 2016).

Procedures for Recruitment, Participation, and Data Collection

I selected teacher participants from locations with which I as the researcher have had minimal or no contact prior to this basic qualitative study. I used administrator level contacts at private schools to receive permission to interview their teachers. I did not make contact with school administrators or teachers until I had IRB approval. I distributed a pre-interview survey to participants who expressed interest in participating in my study. I asked the administrator not to present any information about my research study prior to introducing me to the possible participants. At the initial meeting with participants, I provided information related to the purpose of the study, the study procedures, the voluntary nature of the study, information about me as the researcher with my contact information, and statements regarding the confidentiality of interview participant information and responses.

I used a pre-interview survey to identify teachers with experience integrating multimedia in their online classrooms and seek permission to contact and arrange individual participant interviews. I conducted an initial interview with 10 study participants to gain insight from a wide range of participants. I used the second round of interviews to continue first round interviews that may have warranted additional time, but I focused on participants who shared their insights about the benefits and challenges of multimedia integration and gather additional thoughts not shared during the first

interview. I used the final round of interviews for member checking and to seek clarification to earlier responses using probing questions and seek additional thoughts related to the challenges and benefits of integrating multimedia in online higher education classrooms, and in the event that saturation has not been reached. I transcribed recorded interviews after each round of interviews to identify themes and determine sufficiency and saturation. I continued to seek additional participants if sufficiency and saturation were not reached.

I was the primary collector of data and responsible for analyzing data throughout the study, including the dissemination of study information at the initial online meeting, collecting of pre-interview survey data, and three rounds of interviews. I conducted interviews using an online Zoom virtual meeting tool, which has built in recording tools. I recorded interviews so that precision and integrity of the responses could be maintained. I recorded and transcribed verbal responses of participants and interviewer using a tool called otter.ai that allowed recordings to be transcribed, synched to speaker, and identified speakers. In each round of interviews, I analyzed the recorded interviews to identify themes and possible follow up questions for later interviews. I kept track of all study-related documents, maintaining primary and backup copies of all study-related materials. I used an online Dropbox tool to preserve and access materials in a cloud-based environment, which is accessible through my password protected personal profile. I also kept copies of study materials on protected personal computers and locked storage devices. I clearly labeled all files to identify interview round, date, and participant alias.

Data Analysis Plan

Merriam and Tisdell (2016) highlighted the importance of organizing and maintaining study-related documents, such as participant information, consent forms, transcripts of interviews, and original recordings and sources of information, suggesting Computer Assisted Data AnalysiS (CAQDAS) software, such as NVivo, offer time-saving support when organizing data, but such tools cannot replace the researcher as a the primary interpreter and analyzer of the collected data. Merriam & Tisdell (2016) highlighted strategies for promoting validity, including triangulation, member checking, saturation, discrepant cases, and reflexivity. I recorded each interview and used a digital transcription tool called otter.ai to transform audio recordings into text-based transcripts. After each round of interviews, the recordings were transcribed and analyzed to identify inherent themes related to the research question.

Merriam & Tisdell (2016) also recommended conducting data collection and analysis iteratively, suggesting that data collection and analysis is "recursive and dynamic" (p. 195). In addition, the authors suggested a three step data analysis plan, which included beginning data analysis while collecting data, organizing data early to allow for intense, focused analysis, and constructing categories and themes that will provide the results of the study. I hand coded participant responses following each round of interviews, categorizing and collecting responses according to topics and important concepts within my study to find emergent codes, patterns, and themes, and analyzing the data collected to determine whether enough interviews have been conducted and determine whether sufficient themes were evident to determine when saturation had been

reached and no further interviews were needed (Merriam & Tisdell, 2016). Initially, I

collected responses into answers to each question then explored common terms that

emerged during the conversations, such as engaging, attention, interactive, visualization,

and supporting course objectives. From the conceptual framework and literature review,

additional concepts provided context for framing participant responses and seeking

additional clarification during interviews. For example, Gagne et al (2005) provided an

instructional design focus, Davis (1989) provided behavioral contexts for adopting

technology, and additional literature suggested the importance of learning theories and

the teachers' role during instruction. Essentially, participant responses emerged into four

categories: instructional design, teaching, learning, and technology support. I shared my

initial summary of participant responses along with the transcripts of their individual

interviews to verify accuracy of transcription and receive feedback from participants

regarding my initial understanding of their responses (Merriam & Tisdell, 2016). When

needed, I summarized participant responses to check my understanding of their responses

and seek clarification, attempting to minimize researcher bias (Merriam & Tisdell, 2016).

In addition to identifying themes consistent among participants, I also reviewed

participant responses to ensure validity and reliability, including identifying any potential

discrepant cases that did not conform with participant responses (Merriam & Tisdell,

2016).

Issues of Trustworthiness

Seidman (2019) emphasized the importance of an interviewer developing a good

relationship with the potential participants through the thoroughness and care with

making contact and establishing rapport with the participant. Seidman (2019) also

suggested that while qualitative interviewing requires some flexibility and often

emphasizes the emerging nature of a study, planning and preparation aided the researcher

by focusing the researcher on eliciting the responses of those being interviewed; a

thoughtful structure will decrease the chances of a researcher "distorting what they learn

from their participants" (Seidman, 2019, p. 43). As a researcher, I worked toward

ensuring that my study is conducted in an ethical and trustworthy manner.

Credibility

In qualitative research, an effort should be made to create a "confluence of

evidence that breeds credibility, that allows us to feel confident about our observations,

interpretations, and conclusions" (Creswell & Poth, 2018, p. 256). To ensure credibility

in my study, I developed interview questions based on the research question itself. I

ordered the questions in such a way that I do not inadvertently lead participants to

providing responses that they think I wanted to hear. I maintained recordings of

interviews and transcription of recordings to ensure that participant confidentiality is

maintained. I ensured that transcription of recorded interviews is accurate and digital

records are transcribed verbatim by listening to and reading transcriptions for accuracy. I

used member-checking by sharing my interview transcription with the interviewee to

ensure that I accurately transcribed the interview. And, I worked with my committee

members to ensure that my analysis of data collected is as objective and unbiased as

possible by following proper qualitative procedures.

Transferability

According to Creswell and Poth (2018), "thick description" is necessary to ensure transferability, meaning that the researcher provides details when writing about identified themes. The process of coding is "central to qualitative research and involves making sense of the text collected from interviews, observations, and documents" (Creswell & Poth, 2018, p. 190). Coding involves identifying and generating themes through categorizing, connecting threads, and recognizing patterns within the data collected (Seidman, 2019; Creswell & Poth, 2018; Merriam & Tisdell, 2016). Data analysis involves moving from "narrow codes or themes to broader interrelated themes to more abstract dimensions" (Creswell & Poth, 2018, p. 48).

While I may use a tool such as NVivo for its time-saving features, I plan to hand code the data using insights gained from the interview process itself to find emergent codes, patterns, and themes that identify important concepts within the study. My conceptual framework and research related to teachers' beliefs and andragogy provided some priori codes related conditions of learning, learning outcomes, individualized and personalized instruction, information processing, external events that impact internal processes, behavioral intentions to use technology, motivation, engagement, self-efficacy, and attitudes. I sought emergent codes from commonalities in responses, synonyms, and similar concepts found in responses to each of the interview questions, while also paying attention to the characteristics that make each participant unique. I plan to review, highlight, and summarize each interview as a means of identifying relevant themes associated with each question and do a preliminary analysis after each round of

interviews. In addition, when selecting the participants for the study, I attempted to locate a wide range of participants through criterion-based purposeful sampling and ensure sufficiency and saturation of data collected.

Dependability

In qualitative work, researchers seek dependability of results rather than valid ones needed in quantitative studies (Creswell & Poth, 2018; Merriam & Tisdell, 2016; Seidman, 2019). In qualitative research, Merriam and Tisdell (2016) noted that triangulation is a "powerful strategy for increasing the credibility or internal validity of your research," but contended that the goal is not to triangulate but "crystallize" the data collected during data analysis (p. 245). Dependability comes through compiling evidence to formulate a compelling whole and demonstrate that the weight of the evidence is persuasive (Creswell & Poth, 2018; Merriam & Tisdell, 2016; Seidman, 2019). In addition, dependability requires that a study be reproducible. I followed the approved research plan carefully and maintain clear documentation of all participant interviews and interactions. I worked with committee members to ensure that my data analysis develops compelling themes that address the research question. During data analysis, I demonstrated reflexivity and provide the basis for interpretations of interview responses so that I am able to provide reliable insight into teachers' beliefs about multimedia integration. Another method for checking dependability is through member checks in which I share preliminary findings with participants to determine whether my interpretation "rings true" (Merriam & Tisdell, 2016, p. 246).

Confirmability

According to Merriam and Tisdell (2016), reflexivity is an "awareness of the influence the researcher has on what is being studied," and a critical researcher should understand their own effects on their study. (p. 64). The authors contended that the nature of qualitative analysis is "reflexive and highly interactive" throughout the interviewing, data collection, and concept analysis processes (p. 179). Through reflexivity, the researcher establishes a means for explaining their biases, dispositions, and assumptions as a means for clarifying how the researcher arrived at a particular interpretation of the data (Merriam & Tisdell, 2016; Seidman, 2019). I was the sole analyst of interviews and minimized personal biases about participants by having no contact with participants prior to the study. I maintained clear documentation during the data collection and coding processes, including researcher notes, questions, and reflections. The qualitative researcher looks for confirmability through establishing the value of the data collected (Seidman, 2019). I reviewed and discussed data analysis with committee members for accuracy in an effort to establish confirmability through the value of the responses toward addressing the research question.

Ethical Procedures

Being an ethical interviewer begins with exercising consideration of all aspects of interviewer and researcher interaction (Merriam & Tisdell, 2016; Seidman, 2019). I obtained IRB approval prior to contacting school administrators or teachers. I did not collect any data until I successfully completed the IRB approval process. I followed all instructions from my committee members regarding contacting participants and

conducting interviews. I selected participants using criterion-based purposeful sampling, and all participants were informed of the purpose of the study prior to consent and assured that they can withdraw from the study at any time. I made sure that participants were informed of their rights and signed a consent form prior to conducting interviews. I took great care to collect, record, and preserve interviews to maintain participant confidentiality, and I shared participant specific information with each participant so that they can verify that data collected and analyzed reflect the interview itself. All participants were identified in the study using alias that cannot be traced to the participant. All interview files are stored in password protected environments for a minimum of five years and will be destroyed as required by the Walden Institutional Review Board 06-15-21-0147327, leaving no memory trace on any storage device.

Summary

In Chapter 3, I detailed the basic qualitative study approach to study teachers' beliefs about multimedia integration in their online higher education classrooms. I collected qualitative data through interviews with teachers who have experience integrating multimedia into their online classes and who are involved in the multimedia selection process. I described the setting for the study, the research design and rationale, the research questions, and my role as the researcher. My research plan also included the data collection process, the data analysis process, instrumentation, issues of trustworthiness, and ethical procedures.

The purpose of this basic qualitative study is to explore the benefits and challenges higher education online teachers experience when integrating multimedia

resources into their courses. I used criterion-based purposeful sampling to identify study participants. Basic qualitative study design was selected because it is ideally suited to providing the necessary insights from teachers' beliefs and experiences. I conducted interviews using online meeting tools, and verbal responses were recorded and transcribed by me. I hand coded all data analysis following each round of interviews to ensure sufficiency and saturation have been established. Issues of trustworthiness were demonstrated through reflexivity, following the research plan carefully, and using member checking and feedback from committee members to ensure my study is credible, transferable, dependable, and confirmable. I followed ethical procedures throughout to ensure that my study maintains a high level of integrity and trustworthiness as it explores teachers' beliefs about multimedia integration in online higher education.

In Chapter 4, I analyze the data gathered from the interviews, providing tables, charts, and written analysis to clarify themes identified during the basic qualitative study conducted with teachers who taught at private schools in the western United States.

Chapter 4: Results

Introduction

The purpose of this basic qualitative study was to explore the benefits and challenges higher education online teachers experience when integrating multimedia resources into their courses. The central research question for this study was as follows: What are the beliefs of online teachers regarding the benefits and challenges they experience when integrating multimedia resources into higher education courses? Chapter 4 presents the results of the study, including a description of the setting and participant demographics, the data collection and data analysis processes, an examinatiom of the strategies used to address issues of trustworthiness, and a presentation of the results in alignment with the research question, and conclusion.

Setting

I conducted interviews using the Zoom virtual platform of 10 online higher education instructors who had experience teaching at a variety of higher education institutions in the western United States. I contacted colleagues who were able to recommend potential participants who were asked to email or telephone me to express their willingness to be contacted to discuss joining the research study. Participants contacted me through my Walden University email address. All study participants completed the informed consent form prior to the scheduling of interviews. Zoom interviews with online higher education teachers were conducted between the end of July 2021 and early January of 2022. I conducted interviews from my home office on my personal computer that is password protected. Study participants were at their individual

homes during the interviews. I had no influence or control over the interview location chosen by the participant. In addition to discussing their experiences integrating multimedia into their online courses, participants also discussed the impact of the COVID-19 pandemic in their face-to-face courses. Participants stated that their educational institutions responded to the pandemic by transitioning to more online learning experiences, including synchronous Zoom meetings, simulations, and use of learning management systems tools such as discussion boards and integration of multimedia resources, to enable teaching and learning to continue despite not being able to meet in face-to-face settings. For example, Participant 4 indicated that the COVID-19 pandemic forced schools to move toward more online learning, blending new and old practices to create rich learning experiences, highlighting the need for a champion to provide the leadership needed to support innovative approaches like simulations and gamification. Participant 6 noted that the COVID-19 pandemic was a catalyst for eLearning and highlighted the need to provide access to learning from anywhere. Participant 7 was concerned about the need to provide clinical instruction despite lack of access to clinical sites, suggesting simulations as a means for approximating clinical experiences.

Demographics

I conducted interviews with 10 online higher education teachers who had varying levels of experience selecting and integrating multimedia into their online higher education classes, from new online instructors to those who have decades of online teaching experience (see Table 2).

Table 2

Participant Demographics

Participant	Gender	Years teaching	Subjects	Number & type of schools	Teaching roles	Additional roles	Highest degree
P1	Female	30+	Online education	1 for-profit	Full-time	Author, leadership AECT	Doctorate
P2	Female	9	Nursing	2 for-profit	Full-time, adjunct	Simulation and skills development, administrator	Doctoral candidate
P3	Male	12	Computers, business	3 for-profit	Full-time, adjunct	N/A	Doctorate
P4	Female	13+	Nursing	1 for-profit	Full-time	simulation and skills development, administrator	Doctorate
P5	Female	20+	Psychology, Sociology	6 for-profit	Full-time, adjunct	Curriculum developer	Doctorate
P6	Female	10	Communications, English	12 for-profit	Adjunct	Instructional designer, administrator	Masters
P7	Female	1	Nursing	1 for-profit	Adjunct	Lms administrator, instructional designer	Doctoral candidate
P8	Female	2.5	Psychology, general education	4 for-profit	Adjunct	School counselor	Doctoral candidate
P9	Female	8	Communications, English	8 for-profit, private	Adjunct	Curriculum developer	Doctorate
P10	Female	17	Communications, English	1 for-profit	Adjunct	Instructional designer, academic dean	Multiple masters

Participants described a wide range of experiences from selecting supplemental multimedia resources for standardized curriculum developments to the design and development of online learning experiences with multimedia selected or designed to serve specific purposes within the online course development. Participants also described varying skill levels with designing, developing, and creating multimedia resources. For example, most participants had experience with Zoom and could record and share recordings within an online LMS, but only Participants 1, 5, 6, and 10 were experienced

developing introductions, mini-lectures, and informational videos for their courses. Participants worked for a variety of private schools in a combination of roles, from multiple adjunct positions with multiple schools to a combination of full-time and adjunct roles. All participants were female, except Participant 3. Participants taught a variety of general education and focused subjects, including online education, nursing, computers, business, communications, English, psychology, and sociology. Participant 1 was recently retired from online teaching and had over 3 decades of experience in online education. Participants 2, 6, and 10 had both teaching and administrative experience in online higher education. Participants 2, 6, and 10 had both teaching and administrative experience in online higher education. Participants 6, 7, and 10 worked as instructional designers in addition to their roles as adjunct online instructors. Participants 5 and 9 were curriculum developers for private higher education schools. Participant 1 taught graduate level online education curriculum. Participants 2, 4, and 7 were undergraduate nursing instructors. Participant 3 taught computers at a variety of academic levels, including graduate level business. Participant 5 taught a variety of undergraduate psychology and sociology courses. Participant 8 taught a variety of undergraduate psychology and general education courses. Participants 6, 9, and 10 taught a variety of undergraduate English and communication courses. Participants described a variety of sources for multimedia used to enhance and support the online classroom, including YouTube, Crash Course, Encyclopedia Britannica, Ted Talks, online educational resources, and publisher resources. Some participants were familiar with multimedia development tools capable of

making video quizzes with sequenced learning or game-based activities, including

Articulate Storyline, Canvas Studio, and Kahoot.

Data Collection

Interviews were conducted during 1-hour individual Zoom meetings and

scheduled separately with each participant. Round 1 interviews were recorded during

which a set of preselected questions were asked. Round 2 interviews were recorded

during which participants provided clarification and additional thoughts. Round 3

interviews were recorded during which participants provided member checking of

interview transcripts. Two exceptions occurred in which Round 3 interviews were

completed via telephone and for which an acknowledgement was received for interview

transcripts but no interview took place. I noted all scheduled interview times and dates

for each participant. All interviews were recorded using Zoom and were initially

transcribed using my personal password protected profile on the otter.ai website, an

online transcription tool. I loaded the Zoom recording into the otter.ai tool that

transcribed the recording into a synchronized file, matching text to speaker. The otter.ai

transcripts needed to be reviewed to correctly identify speakers, correct digital

transcription errors, redact identifying speaker characteristics, such as their names and

places of employment, and clarify individual speaker responses when the transcription

was inaccurate. Once I transcribed and summarized the interviews, the individual

transcripts and collective summary were emailed to each participant separately. At which

point, I conducted a brief Round 3 member checking interview with available participants

to discuss any changes needed to the individual transcripts and to ask participants to provide feedback related to the summary provided (see Merriam & Tisdell, 2016).

Data Analysis

I took notes of participant responses while recording interviews, identifying key words and concepts for further exploration, and collecting memory triggers for further research, while exploring participants' beliefs and experiences with multimedia integrations in their online courses (Merriam & Tisdell, 2016; Olafson et al., 2015; Ravitch & Carl, 2016; Rubin & Rubin, 2015; Seidman, 2019). Round 1 notes were used to create verbal prompts for Round 2 interviews where clarification was needed. Interview transcripts were printed and reviewed for needed corrections, using the audio recording to clarify speaker responses. Each question was placed at the top of a blank page, and then each transcript was reviewed for the response to that questions with key components of each response collected onto that page. The summary created for participants provided an initial collection and grouping of participant responses. I then analyzed and grouped the responses to each open-ended question according to similar characteristics to facilitate the collection of key words, experiences, beliefs, and concepts (see Merriam & Tisdell, 2016; Seidman, 2019). Through this review process, I sought to identify themes related to teachers' experiences and beliefs regarding the integration of multimedia into the online higher education teaching and learning processes. I collected participant responses under these headings to generate a more complete analysis of participant responses. This preliminary analysis process yielded themes related to the purposes of multimedia, the roles of teachers in online learning, addressing student needs,

and issues with online instructor training. The themes identified in the preliminary analysis were used to collect additional insights and teachers' beliefs regarding the purposes of multimedia, the use of multimedia to support teachers' roles, addressing learners' needs, and improving teacher professional development. I kept the conceptual framework provided by Gagne et al. (2005) and Davis (1989) in mind as I prepared to interpret the findings.

Discrepant Case

The analysis of responses to interview questions revealed one discrepant case, whose comments regarding the purposes and use of multimedia, addressing student needs, and improving teacher professional development significantly varied from other participants (see Merriam & Tisdell, 2016). While the participants consistently highlighted the benefits of multimedia to support teaching and learning in online higher education, Participant 3 cautioned about costs and challenges associated with creating multimedia. While Participant 3 recognized the flexibility multimedia integrations afforded students, he indicated that multimedia is "not a substitute for the faculty member." Participant 3 was concerned by the for-profit expectations for putting multimedia in online courses without consideration for the expense to the instructor and the belief of for-profits that creating multimedia was a faculty responsibility.

Evidence of Trustworthiness

As the researcher, I worked to ensure that my study was conducted in an ethical and trustworthy manner. I took great care during the participation invitation process to communicate professionally and follow the approved processes.

Credibility

To ensure credibility, I used the central research question to develop relevant interview questions. I maintained recordings of the interviews in secure locations. I labeled all document participant interviews with a number and the round of the interview; for example, Interview 1.1, to maintain participant confidentiality. Participants were not identified by name, and identifying characteristics mentioned during the interview were redacted. I asked participants to review their interview transcripts for accuracy and to review the summary of the research study to provide additional insights and thoughts. I worked with my committee members to ensure that my analysis of data collected was as objective and as unbiased as possible following proper qualitative procedures.

Transferability

To ensure transferability, I hand coded my study results using insights gained from the interview process itself to find emergent codes, patterns, and themes that identified important concepts within my study (see Merriam & Tisdell, 2016). My conceptual framework and research question related to teachers' beliefs, and andragogy provided a means for identifying essential concepts related to the conditions of learning, individualized and personalized instruction, information processing, and external events that impact internal process. In addition, I explored behavioral intentions to use technology, motivation, engagement, self-efficacy, and attitudes. I sought to find codes from commonalities in responses, synonyms, and similar concepts in participant responses (see Merriam & Tisdell, 2016). In addition, I sought participants with a wide

range of experiences, seeking purposeful sampling and ensuring sufficiency and saturation of data collected (see Merriam & Tisdell, 2016).

Dependability

To ensure dependability, I followed the approved research plan, maintained clear documentation of all interviews, and worked with committee members to ensure that my data analysis developed compelling themes that addressed the research question. I used a reflective process to gather insights and crystallize participant responses to establish the basis for my interpretation of interview responses. Throughout the data collection and analyses processes, I diligently sought insight into teachers' beliefs about multimedia integration in online higher education. I used member checking by sharing my preliminary findings with participants to ensure that my interpretation "rings true" (see Merriam & Tisdell, 2016, p. 246).

Confirmability

To ensure confirmability, I used reflexivity to maintain awareness of my thoughts and reactions during interviews (see Merriam & Tisdell, 2016). I took notes during each interview. I also summarized and synthesized the collective responses and shared those insights with the participants. I then created lists of key concepts identified in the literature review. In addition, I created lists of key concepts discussed in the interviews and attempted to categorize and align participant comments through a systematic review of notes and transcripts. I asked for participant feedback regarding the interview transcripts and summary. As the sole analyst of participant interviews, I minimized contact with participants prior to the study. I maintained clear documentation during the

data collection and coding processes, including researcher notes, questions, and reflections. Next, I reviewed and discussed data analysis with committee members for accuracy and to establish the confirmability through the value of the responses with the goal of addressing the research question and thoughtfully, and with an eye toward confirmability (see Merriam & Tisdell, 2016).

Throughout the study, I exercised consideration for study participants. I did not begin collecting data until I had IRB approval for the study process and followed committee member instructions when conducting interviews for my basic qualitative research study. I selected participants through purposeful criterion-based sampling in which all participants were confirmed to be online higher education teachers with experience selecting and integrating multimedia in their courses (see Merriam & Tisdell, 2016). I conducted meeting interviews using Zoom and transcribed each interview personally. Throughout the study, I followed ethical procedures to ensure my study was credible, transferable, dependable, and confirmable.

Results

During each interview, I took handwritten notes, transcribed the recordings, and separated interview questions and participant responses. An initial summary of participant responses provided a starting point for a more thorough examination of relevant themes and implications related to teachers' beliefs about multimedia integration in online higher education (see Merriam & Tisdell, 2016). The research study summary consisted of organized responses into a few collective groups, which served as an initial coding that ultimiately helped identify the themes for the study (see Merriam & Tisdell,

2016). The first group consisted of collected participant responses into those related to their experiences with multimedia resources, their criteria for selecting multimedia, and their beliefs related to the benefits of multimedia in the teaching and learning process. The second group consisted of collected responses according to their beliefs about the role of multimedia and the evolving role of technology in a postpandemic world. The third group collected responses related to the challenges associated with integrating multimedia, assumptions and misconceptions about multimedia integration, and teachers experiences with in-service training and professional development for online teachers.

This preliminary analysis and syntheses of participant responses identified some key themes related to teachers' beliefs about the benefits and challenges related to integrating multimedia into online higher education courses (Merriam & Tisdell, 2016). For this study, four themes emerged from analysis of data. Those themes include teachers' beliefs about the purpose of multimedia in the teaching and learning processes, the role of the teacher in online learning, instructional strategies using multimedia, addressing student needs, and developing online course curriculum, and issues associated with training and teacher professional development.

The Purpose of Multimedia in Teaching and Learning

The first theme that emerged from data analysis related to the purposes of multimedia integration in online higher education. Responses to interview questions were analyzed according to the four themes identified from Round 1 and 2 interviews and reaffirmed with participants during Round 3 discussions. When describing their experiences, their criteria for selecting multimedia resources, and the value of multimedia

resources in teaching and learning, many participants described the need to increase engagement. Participants suggested multimedia resources could help the teacher gain and keep learner attention, alleviate boredom from textbook reading assignments and PowerPoint presentations, keep learning fresh and interactive, address different learner styles and needs, and provide a variety of approaches to learning. Participants wanted to ensure that learners are completing required assignment and felt a need for checkpoints to assess the learning experience. Participants believed that multimedia resources could be used to connect the lesson and the learning objectives for the module or course, According to participants, multimedia resources resonate with students as they connect new learning with personal experiences, and also help complement textbook reading and instructor lectures.

When describing the role of multimedia in online higher education, discussions included the evolving role of technology in learning (especially in a post-pandemic world), differing teaching and learning needs, the changing roles of the teacher and the student in the online learning environment, considering the relative merits of different types of resources, such as hour-long lectures to shorter focused instructional videos that highlighted a challenging concept. Interviews highlighted the need for multimedia resources to be both supplemental and directly integrated into the curriculum without being overwhelming, suggesting that students need to be able to determine whether to view suggested multimedia resources.

Participant 1 indicated that she used the learning theory and instructional design theories she taught to model the important concepts within her lesson activities, stating,

"When I taught a different theory, I would actually use that approach in my teaching of that lesson." The participant noted that she is a retired online educator whose focus was related to engaging adult online learners, and "how to form groups, how to engage students, to get them involved and engaged with the class and using fun activities or challenging activities." She stressed the importance of "making meaning" and creating activities in which learners are "applying ideas into real life situations, is where the learning happens."

Participant 2 indicated, "I don't think we really have a choice to not to do multimedia," that students "are fed technology from the day they're born," and that it is needed to hold their attention. This participant stated that "when you deliver the same information in different ways, you do kind of develop this sense of reliability." Then continued, and stated that she has some experiences teaching online and taking "an online course, where we learned different types of media, delivery of curriculum." Participant 2 integrates videos that she made into her courses. She stated, "It's good to deliver things in different platforms in different ways, just to keep the course fresh and keep the students' attention."

Participant 3 has experience "making videos to be shown to the students." This participant described using videos when he got sick to be able to provide instruction when he could not be in class, stating that having the ability to utilize multimedia "is very important to the schools." This participant believes that face to face instruction "is better than just making videos," which should be used for "emergencies." He continued by stating that the purpose for using multimedia depends on the discipline and for what

purpose, but indicated that he believed multimedia should primarily be for emergency purposes.

Participant 4 described herself as "reserved" and not "comfortable just teaching traditionally." She suggested that using multimedia is a creative way to engage learners, indicating that using simulations and games help her be more effective. She uses scenarios and drama to make the class fun and engaging for students. Participant 4 noted that all multimedia resources "should be integrated" into the curriculum and activities as part of the course design. This participant also spoke about the misconception that multimedia is somehow being used to cheat, that it makes things too easy, and spoke about the value to the student of being able to use multimedia to go back and "review as many times as they want" and "put things into context." Participant 4 described "pushback" from administration and committees and general lack of support from leadership. She hoped to overcome conservative, traditional methods, believing there is a need to try new things, be willing to learn and grow as a professional teacher, and address needs and expectations resulting from COVID responses.

Participant 5 stated that she had made "intro videos, introducing myself to the class," explaining "difficult assignments or solidifying concepts that may be a little more difficult," using video quizzes, and links to videos to "support discussions." She described hitting "multiple learning styles," adjusting to the "digital mindset" of students, and adding "interaction" and videos, with which they are comfortable.

Participant 6 stated that her experiences prior to COVID-19 included standard PowerPoints or maybe showing a video in class. In addition to teaching online,

Participant 6 is an instructional desigenr who uses Articulate Storyline and that now "every project I work on" has some type of video or voiceover involved. Articulate Storyline is a tool used to create interactive learning experiences. Like PowerPoint, Articulate Storyline presents information through slides, but it also enables learning experiences to be designed with a variety of multimedia resources, knowledge check activities, quizzing, and assessments.

Participant 7 shared that she has taken classes with multimedia integration and uses multimedia integrated into the standard courses she teaches. This participant considered multimedia valuable because it "addresses different learning styles" and "increases engagement" by providing "interactive learning opportunities."

Participant 8 shared that she "wanted some visualization while teaching, and I would use PowerPoint presentations." Participant 8 also described looking for videos to explain concepts and support instruction. The participant believed that it is "helpful because a lot of people are visual learners," and it "adds a dimension to your instruction." The participant continued by stating that multimedia is "very essential and helpful for students to visualize" what a "professor is trying to teach."

Participant 9 described multimedia helping the "lessons come to life" and reported using videos from Ted Talks, Crash Course, and Encyclopedia Britannica to support her lessons.

Participant 10 has experience building online courses in Canvas, using external tools, LTI integrations, and publisher resources. This participant has "worked with faculty to link to media within a course." She indicated that it is "a good idea for the

instructor to incorporate media" in an online course, but "the amount really depends on the course." On that line of thought, the participant noted that multimedia can be used to "illustrate points," "break up, maybe otherwise static content," and "helps keep the content engaging." She indicated the challenges of LTI integrations and "incorporating media from an external page that could go down at any time." When working with publisher materials, Participant 10 reported that they "watched all of the videos" and "created a chart" that "helped me align each of those modules or chapters with a specific video."

Regardless of the relative length of teaching experience of the study participants, the need to select and integrate multimedia with a clearly defined purpose came through. In rounds 1 and 2, participant suggestions included embedding multimedia resources and tools directly into the learning management system, matching multimedia to the module or lesson, aligning multimedia content to learning outcomes, objectives, skills, and competencies, and integrating multimedia directly into the course curriculum as an essential component of the learning activities. Based on insights gained from study participants, multimedia should be used to enhance and support learning. Participants suggested that video quizzes and watching videos integrated within the eTextbook should be built directly into learning activities.
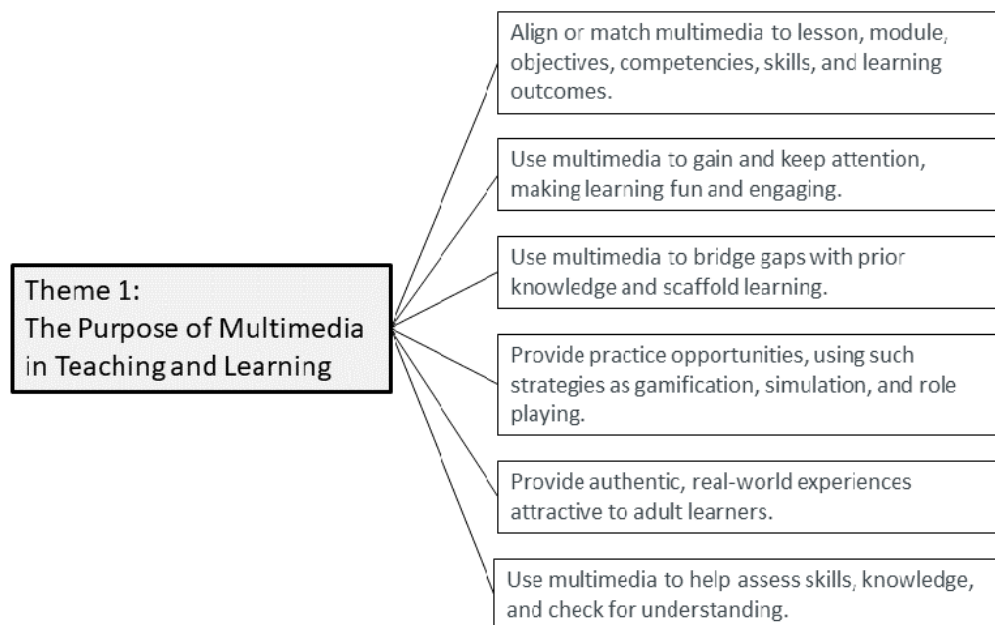
Throughout the interview process, teachers identified intentional and purposeful uses for multimedia integrations that would enhance teaching and learning. In the final interview, Participant 1 suggested highlighting that multimedia should support the authentic, real-world experiences and expectations of adult learners, who need to know

what is in it for them. Participant 2 suggested the importance of using multimedia to

support course objectives, learning outcomes, and conduct competency and knowledge

checks. Participant 6 emphasized the idea that multimedia should support instructional

strategies and learning goals of adult learners, suggesting differences between andragogy

and pedagogy. Participant 4 stated that multimedia "needs to be part of the curriculum

and integrated fully and throughout." Participant 5 wished to emphasize that online

educators need to make "sure that the media we do use is engaging." Participant 5

observed online educators need to "be adaptable and adjust to the learner needs" and that

"content is important, but how it is presented matters too." According to Participant 5,

online educators have the challenge of "staying current with the newest technologies."

Participant 6 was concerned that multimedia integrations support instructional strategies

and learning goals for adult learners. Participant 7 who works at schools that used

standardized curriculum indicated that the integration of multimedia needed to be limited

to adding introductory videos, supporting the facilitation of the course, and increasing

student engagement. Participant 8 noted that while institutions may encourage instructors

to use multimedia to help facilitate online learning, teachers are not provided with a great

deal of guidance on what to use or where to find it. Participant 10 suggested that when

integrating multimedia, it needs to "serve a specific goal" and that teachers need to "

evaluate the appropriate place and time to add the video."

Throughout the interview process, participants suggested a variety of purposes for

integrating multimedia into online higher education (see Figure 1).

Figure 1

Theme 1: The Purpose of Multimedia in Teaching and Learning

Theme 1:
The Purpose of Multimedia in Teaching and Learning

- Align or match multimedia to lesson, module, objectives, competencies, skills, and learning outcomes.
- Use multimedia to gain and keep attention, making learning fun and engaging.
- Use multimedia to bridge gaps with prior knowledge and scaffold learning.
- Provide practice opportunities, using such strategies as gamification, simulation, and role playing.
- Provide authentic, real-world experiences attractive to adult learners.
- Use multimedia to help assess skills, knowledge, and check for understanding.

The Role of the Teacher in Online Learning

The second theme that emerged from data analysis was the role of the teacher in online learning. Participant suggestions included the faculty role in online learning needing to be more creative and engaging, leaning more toward a mentor or guide on the side rather than the sage on the stage role of traditional face-to-face lecture classrooms. Interviews highlighted changing expectations for technology use in traditional asynchronous online classrooms, suggesting the importance of teacher presence in online learning and that online teachers need to be flexible, plan for the unexpected, and incorporate more opportunities for synchronous connections with students.

Participant 1 focused on how multimedia can be used to "motivate" and "relate" to the student, suggesting that for adult learners, we need to imagine ourselves as our students and ask the question, "what's in it for me." This participant believed that "having something that is practical, that they can relate to makes a difference" in the student learning experience, stating that "It's a waste of time, if it is not authentic."

Participant 2 recommended "always have a backup plan," noting the importance of knowing your content and being flexible when something unexpected happens. Participant 2 is experienced using games and simulations, suggesting the value of fun and competition for improving attention and learning. She recommended having students use Kahoot and other tools for doing class presentations.

Participant 3 indicated that multimedia is "not a substitute for the faculty member" and was concerned about the technical process of creating and producing videos with proper lighting and voice overs, and the expense for teachers associated with creating their own multimedia. This participant was concerned by the for-profit expectations for putting multimedia in online courses without consideration for the expense to the instructor. He also expressed concerns about the costs in both time and money of instructors producing videos themselves. He further shared the concern that for-profit schools believed that creating multimedia was a faculty responsibility, that there should be no cost involved, "that it just happens for free."

Participant 4 suggested that "multimedia provide opportunities for teachers to meet student learning needs and assess performance and understanding." Further, the

participant spoke about the practical use of breakout rooms for group work and collaboration and to provide students with feedback and varied learning opportunities.

Participant 5 stated the multimedia integration "should be supportive. And in addition to but not in place of the actual instructor, teaching and interacting. I think it's a good enhancement tool" and "there's more than one way to present concepts," that presenting concepts in different ways helps them "resonate' with students, and "allows us to impact more students." Participant 5 discussed issues with third party technologies integrated into the learning management system and broken links to resources that are both frustrating to the teacher and the student. Participant 5 stated that we have preconceptions, do not have the comfort level, or lack of knowledge about technology integration, suggesting that we become "singularly focused, and we block any other ways of teaching," and "we become our own barrier." Then she suggested that multimedia should "support the objective and the curriculum," should be "objective driven," be American Disabilities Act (ADA) compliant, and prefers interactive resources.

Participant 6 described using multimedia as "checkpoints" for learning and addressing a "different level of engagement" and stressed that there should be "more emphasis on multimedia" in higher education. She stated that multimedia should be used as a "catalyst," and is "playing a huge part in the learning experience." This participant indicated a need for "checks and balances for the learner" to ensure that they have the knowledge and provides immediate feedback regarding her effectiveness as a teacher.

Participant 7 recommended "integrating one multimedia activity per unit," but does not believe that it should be a graded activity that it should be a "kind of safe space,

a way to practice without consequence." She believed that integrating multimedia helps in the teaching process because it helps her "connect the dots for the objectives" of the unit or the course, and also suggested using office hours to conduct demonstrations using multimedia.

Participant 8 stated that multimedia helps her provide "visualization" for the student and help them better conceptualize ideas. Participant 8 suggested mixing up lessons so that they gain learner attention and keep their interest. She was concerned about using technology to aid in the research process, that students do not always have the skills needed and will need support.

Participant 9 highlighted the role of the teacher as facilitator and mentor and that multimedia should be used to assess learning and progress. She indicated that multimedia provided "more materials to present the lesson," providing variety and helping lessons not be "dry and boring."

Participant 10 suggested that faculty "leverage any publisher materials" and indicated the importance of captions and transcripts for multimedia resources being integrated.

During the Round 1 and 2 interviews, participants indicated, especially related to the impact of the COVID-19 pandemic, that the teachers' role in learning is changing. Participant 5 suggested that when using multimedia, it is important to be flexible and expect the unexpected. Participant 2 noted that teachers should always have a backup plan for when the originally selected technology doesn't work as expected. Participant 10 suggested using multimedia for introduction videos and mini lessons for especially

difficult concepts, frequently asked questions, and getting to know their teachers. When using multimedia, Participant 9 indicated the importance of providing clear instructions, requirements, and expectations. In addition to asynchronous uses of multimedia, Participant 2 suggested using Zoom meetings to provide live demonstrations, answer questions, share computer screens, and create breakout rooms for group discussions. These synchronous uses provide opportunities for teachers to assess and monitor student learning and help ensure that students are paying attention and staying engaged. Multimedia video quizzes can be used asynchronously to assess learner understanding at strategic moments.
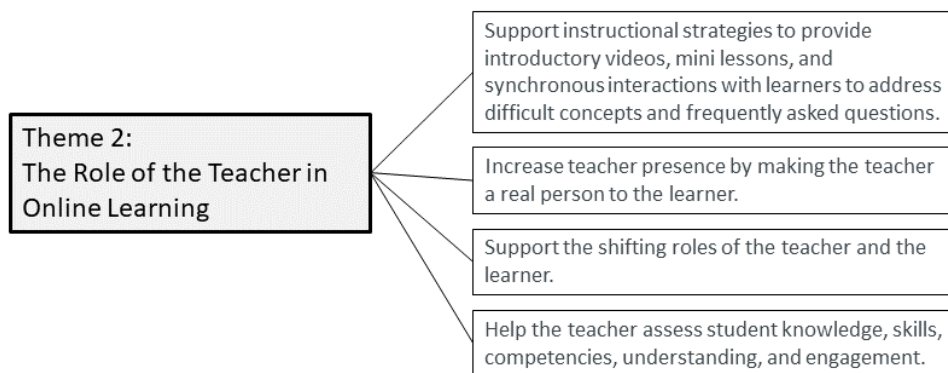
Participant 1 highlighted that online teachers need to be more of a "guide on the side" and course facilitator than a lecturer or "sage on the stage," emphasizing the importance of the learners seeing the teacher as a real person and that multimedia should be curated purposefully to support different phases of learner engagement. Participant 1 also suggested that the relationship between teachers and learners shifts during the course learning experience, with the teacher stepping back more as the learner takes greater responsibility for their own learning. In addition, Participant 1 suggested the importance of developing rapport between teachers and learners, while creating a learning space in which everyone can respectfully disagree. Participant 4 is using more synchronous meetings with students in traditionally asynchronous courses, using Zoom meetings to answer questions and provide assignment guidance and feedback. In addition, Participant 2 commented that traditionally face-to-face courses are using more multimedia, video quizzes, and technology to enhance learner engagement.

Participant 4 noted that teacher presence is "one of the most important things," that if students do not feel instructor presence, "they're not engaging in the classroom or the learning at all." Participant 5 suggested that teachers need to be adaptable and stay current with the evolving nature of technology. Participant 6 highlighted that teachers need to think about the subject being taught and how to adapt resources to their subjects, noting that multimedia integration is more about matching subjects to appropriate method of delivery than it is about addressing student learning styles. Participant 7 emphasized the purposeful use of multimedia by teachers to support teaching and learning objectives. Participant 8 suggested that multimedia needs to be purposefully selected by teachers to enhance teaching and support learning engagement. Participant 10 limits the use of videos to the online discussion forum and the introductory video, suggesting that teachers who work with standardized curriculum must consider the time on task expectations for courses that use preset video resources; however, Participant 10 also noted the importance of teacher presence. Participant 10 suggested that teachers should have more involvement in the selection process for standardized curriculum.

Throughout the interviews, participants suggested ways to use multimedia to support teacher presence and course facilitation (see Figure 2).

Figure 2

Theme 2: The Role of the Teacher in Online Learning

Theme 2:
The Role of the Teacher in Online Learning

- Support instructional strategies to provide introductory videos, mini lessons, and synchronous interactions with learners to address difficult concepts and frequently asked questions.
- Increase teacher presence by making the teacher a real person to the learner.
- Support the shifting roles of the teacher and the learner.
- Help the teacher assess student knowledge, skills, competencies, understanding, and engagement.

Address Student Learning Needs

The third theme that emerged from data analysis was focused on addressing student learning needs. Discussions highlighted the increasingly active role of learners as they move through their courses and programs and as they work toward becoming self-directed, life-long learners, the importance of students being able to replay videos as often as needed to help students visualize important concepts, suggesting that some multimedia activities should be used as a tool to engage and challenge students without the anxiety associated with graded activities.

Participant 1 noted that not everybody has access to technology, which can create a frustrating learning experience. She was concerned with both technology restrictions some learners experience as well as preparing students to be "lifelong learners" and "responsible for their own learning." This participant noted the need to foster "lifelong learning" and that adult learners "bring so much of their personal experiences into the

classroom to share," and she looks for ways to engage them with authentic experiences where they apply the concepts of the lesson. She also recommended having students build multimedia resources themselves as they gain experience.

Participant 2 indicated that attractive multimedia can enhance their learning experience because it helps students "contribute more" and "be more accountable for their learning." This participant commented the simplest things like connectivity issues, lack of internet service, can make accessing media problematic or having proper computers can cause problems for both faculty and students. She also noted the issues related to the students being distracted by the things going on around them while they are trying to attend online classes, commenting about the impact of the pandemic that "I don't think that especially adult learners didn't anticipate their kids learning from home too." This participant was concerned with levels of income, multigenerational homes, and trying to learn in an often disruptive and chaotic learning space. She expressed a need to be mindful of student access to resources, user-friendliness of content, and ensure that the cost does not come out of the student or instructor pocket. She also spoke about generational misconceptions "like the older learner, that are not going to be as tech savvy as the younger," cautioning not to make assumptions about learners.

Participant 3 only mentioned the flexibility of multimedia integrations for students.

Participant 4 emphasized interaction and engagement and using multimedia to keep students' attention. This participant stated that multimedia helps students be "more

engaged." She stated that you "can engage the students more" when adding multimedia to your classes.

Participant 5 indicated that multimedia can be used to help ideas resonate with students, provide different ways to understand lessons, and help students grasp challenging concepts.

Participant 6 highlighted accessibility of multimedia integrations in online education, that students are "able to access it from anywhere." This participant described higher education as being a bit "traditional" and hesitant to engage in eLearning, and lacking the knowledge and "initiative" to do so effectively. She pointed to technical issues as a significant barrier to successful integration of multimedia. This participant was concerned that technology be easy to understand, "intuitive," and user friendly regardless of the level of technical experience, suggesting "pretty much everybody knows how to use YouTube" to integrate media into a lesson. Participant 6 focused on engagement and need for knowledge checks to drive learning.

Participant 7 stated that multimedia "can help students learn more effectively by applying the concepts that they may not be sure of; can kind of help bridge those knowledge gaps." This participant suggested that students have "different experiences with technology and their understanding of it," commenting that it is "important to have some sort of resource or help to remove the barrier." She indicated the need for support and resources to help remove technological barriers and address the different capabilities and technological understanding of students. The participant suggested using something "current," that aligns with best practices, isn't "unethical," that protects personal

information, and addresses "legal considerations." Further, the participant pointed out

that administrators often believe "that each student prefers some sort of multimedia

integration," suggesting that today there is "varied student populations with varied

experience and varied skill sets and qualifications" and not everyone wants to use

multimedia.

Participant 8 stated that multimedia helps her provide "visualization" for the

student and helps them better conceptualize ideas. This participant believed multimedia

can aid in visualization, providing both auditory and visual ways to learn.

Participant 9 expressed concern about students getting bored, that with

multimedia and interactive online games "we're meeting the students' needs." This

participant emphasized addressing student needs, helping overcome otherwise dry and

boring lessons.

Participant 10 emphasized student differences and the need to supplement lecture

content and textbook reading and also highlighted the need to help student achieve

learning outcomes, focus and direct students to important concepts, believing that

integrating multimedia can help support these learning goals. This participant highlighted

the need to put media where it "makes the most sense for students" and encourage

students to respond to media, providing very specific instructions and clear expectations.

She was concerned with addressing student learning needs, including students with

disabilities, who may need transcripts or captions for videos. The participant continued

by discussing the need to review the credibility of resources from outside sources like

YouTube and indicated that she does not want to force students to watch videos, but uses

them to foster online discussions. The participant stated "a lot of people think it's easy to just throw something together." She also spoke about the need for transcripting and captioning of multimedia resources.

Throughout the Rounds 1 and 2 interviews, Participant 1 highlighted the need to engage students in meaningful learning experiences using multimedia resources. Interviews often focused on the use of multimedia to address student learning needs, including keeping videos short and focused to gain and keep learner attention, creating a comfortable learning environment in which students gain confidence through low stakes opportunities to test themselves for understanding as they engage in learning through interactive videos and video quizzes. Discussions highlighted the need for a variety of activities to help keep learning fresh, alive, and engaging, as more learners have a digital mindset and expect to learn using multimedia resources. Participant 4 and 6 highlighted the value of multimedia resources as a remediation tool, suggesting that learners benefit from being able to replay videos as often as needed to learn a challenging concept.

In the final member checking round, participants highlighted different aspects of the learners' needs, including an increasingly active role of adult learners as they become more self-directed, life-long learners. Participant 1 highlighted the importance of practical, real-world, authentic experiences and the need for learning to be fun and engaging. Participant 4 stressed the need to "keep students active and engaged," build excitement, and be able to gage learner interest and understanding of the curriculum. Another participant suggested that the selected multimedia needs to be "valuable" to the learner and "needs to be engaging." Participant 6 suggested that when addressing student

learning needs, the conversation needs to shift from addressing student learning styles to matching the content to the best method for delivering specific content types, suggesting that adult learners have different preferences and need choices and options for interacting with course subject matter. Participant 7 suggested the importance of engaging with relevant content and the need to consider the functionality of digital resources and technologies when engaging in the online learning experience. Participant 8 highlighted the need to engage learners and support learning goals, and that multimedia is an essential part of the learning experience. Participant 10 stressed the need to support otherwise text heavy course curriculum, suggesting the multimedia resources should be regularly reviewed for relevance and timeliness.

Throughout the interviews, participants suggested ways to use multimedia to address student learning needs (see Figure 3).

Figure 3

Theme 3: Address Student Learning Needs
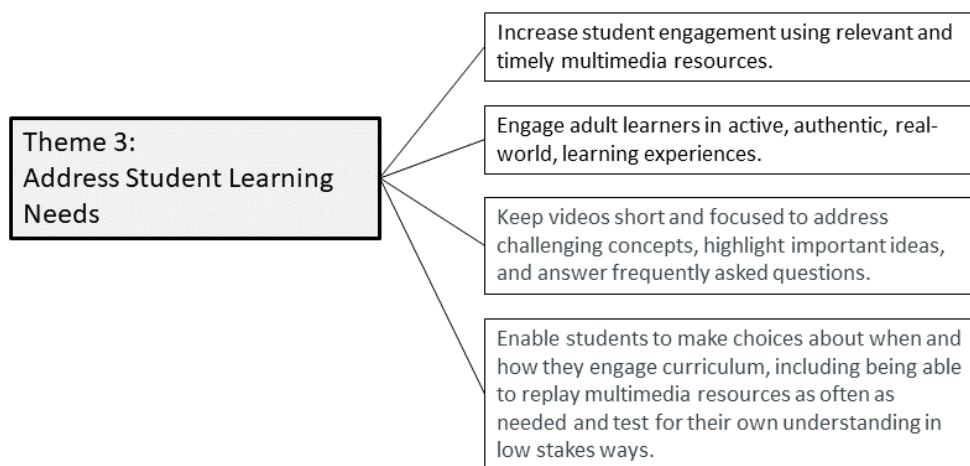
Issues Associated With Training and Teacher Professional Development

The fourth theme that emerged from data analysis was issues associated with

training and teacher professional development. Discussions about the challenges and

barriers to integrating multimedia and assumptions and misconceptions about multimedia

highlighted the need for technology support and training for faculty and students to

alleviate the frustrations associated with broken links, unavailable third-party resources

integrated into the online classroom, and unreliable internet access. Available in-service

trainings and professional development activities, when provided by academic

institutions at all, focused more on the tools available or required for instruction, such as

Zoom or the LMS. Interviews revealed that additional training in creating or integrating

multimedia in their courses beyond how to use the LMS tools to upload multimedia

resources, PowerPoint presentations, or course documents. Discussions revealed a wide

variety of assumptions and misconceptions about multimedia integration from

administrators, instructors, and students, including that administrators often expect

faculty to be capable of creating and providing their own multimedia resources to their

courses without fully understanding the skills, time, and expenses involved, indicating a

need for teacher professional development that included practical applications for using

multimedia resources during the teaching and learning experience, indicating a need for

training related to teaching and learning principles for effective integration of multimedia

activities and resources throughout the teaching and learning process, and revealing a

need for opportunities to engage with other teachers to discuss effective teaching

strategies and explore the potential for using multimedia within the teaching and learning experience.

Among the most significant challenges that teachers described, the need for support and training related to multimedia was evident. In the initial interviews, participants suggested the need for technology support to more effectively manage digital resources to minimize issues with third-party resources, check for broken links to course content, and ensure that digital resources are current, relevant, timely, and engaging. In most cases, teachers received training related to managing the online learning environment (LMS) and address specific institutional requirements, such as grading, feedback, and attendance reporting. Interviews highlighted the need for training specifically related to multimedia integration beyond basics like uploading a video to the LMS. In the round 1 and 2 interviews, interview responses indicated a need for training and teacher professional development related to practical applications for using multimedia during teaching and learning, highlighting a need for training related to teaching and learning principles to integrate multimedia activities and resources more effectively. Participant 5 indicated a need for more training for adjunct instructors and a need for teachers to have opportunities to learn from each other and discuss effective strategies used by other teachers. Interviews revealed that few participants had experience creating videos, scripting, producing, and editing their own resources. Participants 3 and 4 received training related to this process, including some basics regarding lighting and recording video resources. Interviews revealed that most received some basic training in using synchronous tools like Zoom. Participant 4 indicated a need for training in using

specific strategies, like creating breakout rooms and advanced tools. Participant 5 suggested that having an opportunity to practice different techniques within a sandbox would be helpful.

Participant 1 spoke about administrators who "grew up in a face-to-face-classroom" and the perception that "online learning wasn't rigorous enough." Participant 1 was concerned that teachers too frequently have no real preparation, videotaping lectures is not a good use of multimedia, and that many are "not realizing what potentials are there." This participant commented "When it's done right, it's done beautifully." She talked about the possibilities of online teaching and learning and that "when the student sees the faculty having fun, it changes things." This participant suggested that anyone who wants to teach online should take an online course and that they need training and support. The participant highlighted how multimedia can make concepts real for students, suggesting the need to pace engagement so "they're taking more and more responsibility" over what is being learned, stressing not just what they learning in the class but what "applies after the classroom is over." She suggested that teachers need the support of their peers and spoke about the need for training faculty to be more creative when integrating multimedia and that the lack of training can be a barrier to effective use of multimedia.

Participant 2 spoke about the need for training subject matter expert teachers how to understand what they are doing with technology and that "They don't know how to engage the students" using technology.

Participant 3 spoke about the skill needed to develop and integrate multimedia, "that they have to be more than just a subject matter expert in their field." This participant received some training with creating videos, covering such concepts as lighting and sound, and adding content to the LMS. He suggested the need for more training with video production.

Participant 4 suggested the need for more support and training, stating "I still didn't really get training either. My training was what I went after." The participant commented that she had been an online student so she wanted to do more to incorporate multimedia and simulations in her courses. She noted a need for more training that her school has online specialists who are responsible for onboarding faculty, but that "they're so busy, and there's only a few of them, it doesn't always happen.

Participant 5 spoke about the importance of aligning multimedia with outcomes and competencies, the misconception of administrators that integrating multimedia is easy, that they do not understand the complexity of integrating multimedia effectively. This participant also spoke about the teacher misconception that it is too hard to create multimedia, that it needs to somehow be perfect with "bells and whistles and fireworks." She noted that working with multimedia is both not as hard as it looks and not as easy, pointing out the need for training and support when using third party resources and finding or creating your own. She highlighted the need for flexibility and support for both understanding content and working with technology. The participant suggested that part of faculty training should include "a sandbox, where they can play around, and they can create, and they can integrate and get feedback from others who are doing the same

thing." She commented that even when training is available "the support layer is missing" so "they're not very responsive," that faculty need more training that "needs to be followed up to make sure it's actually being integrated," and suggested a two-part training where they are shown and taught about the resources and then they "actually create media, upload media and get feedback from our peers that are doing the same thing."

Participant 6 noted that faculty training is "almost nonexistent when it comes to multimedia" and indicated a need for the "actual science of learning" when it comes to such things as multimedia and PowerPoint design. She suggested in-services that include screen sharing and suggestions for using tools, noting meetings dedicated to integrating technology are "almost nonexistent." This participant discussed the faculty perception that they "don't want to deal with multimedia because it's a bit scary." She suggested the need to embrace multimedia because it is a part of learning and education and that "Everything's moving in that direction," highlighting the importance of "having that knowledge check" when using multimedia. This participant also suggested that LinkedIn has a variety of learning courses to help faculty build their multimedia skills.

Participant 7 suggested the need for an IT professional to be available to help "troubleshoot any technological issues that may arise with the multimedia integration." The participant stated "I would say that there are opportunities for growth for instructing the professor" on how to use multimedia activities. This participant was also concerned with the lack of professional development but was also concerned that once multimedia is integrated into courses that it needs to be updated every "three to five years," suggesting

that there are many opportunities to improve training in video quiz building to improve student knowledge checks.

Participant 8 stated "I don't think I've had enough trainings" and the "biggest struggle is not knowing what's out there." This participant commented on the need to know "the advantages of multimedia," noting the importance of keeping students' attention, considering it a success "if they're able to discuss what they just learned." She was concerned that "people may assume that they're letting the technology teach the students and the professors are just using it as a crutch instead of doing it themselves." The participant suggested that professional development related to multimedia is not offered enough and commented that not enough training is offered, and more training is needed to show teachers what is out there an how to use them.

Participant 9 was concerned about the assumption that using technology is "self-explanatory," that everyone should just "know how to do it." She spoke about the need for training and support for teachers integrating multimedia into teaching and learning. This participant stated "Some people are scared of the unknown," suggesting the need to try different programs. She suggested students try different things to gain comfort with technology, sharing that she makes a point to do various types of trainings. This participant further stated that training should be "uniform" so that everyone is using the same systems the same way.

Participant 10 suggested that institutions "should look into providing their faculty with more opportunities to look for multimedia and how to incorporate that. This

participant stated "I don't think that any of them have been geared toward incorporating multimedia into online courses."

In the round 3 interviews, participants provided additional examples related to the need for additional training and teacher professional development opportunities. Participant 1 suggested that too many for-profit schools are focused on business needs and profits rather than on ways to improve faculty training and support student learning. Participants 8, 9, and 10 suggested that teacher professional development is often available through a variety of online webinars, which may account for the lack of training at specific higher education institutions. Participant 10 suggested that the higher education institution may not have someone on staff who specialized in training online teachers and could not remember any training related to best practices for evaluating, incorporating or using multimedia, or editing teacher prepared videos. Participant 4 indicated that that the institution did have someone who specialized in online instructor training and onboarding, but that the person was very busy, so training was not always consistent. Participant 2 suggested that because technology is evolving very rapidly, there is a need for training related to " best practices" and the challenges associated with change. Participant 6 suggested a need for training in how to effectively enhance publisher PowerPoints, adding speaker notes, using colors, and avoiding distractions for learners. Participant 7 highlighted the need for training related to multimedia integration, expressing concerns related to interoperability and ease of use of resources.

Throughout the interviews, participants suggested the need for additional training and teacher professional development (see Figure 4).

Figure 4

Theme 4: Issues Associated With Training and Teacher Professional Development
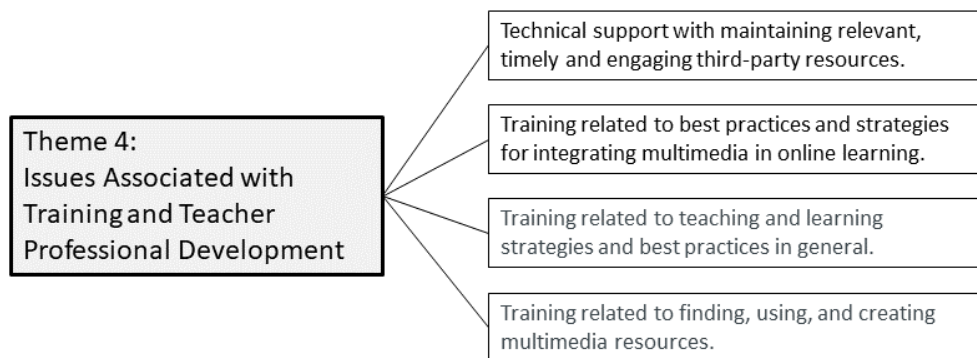
Summary

In Chapter 4, I described the setting, participant demographics, and the data collection process. I also described the data analysis process and the strategies that I used to ensure the trustworthiness. I provided the results of my study and identified the four themes that emerged from participant interview responses. Theme 1 explored the importance of using multimedia resources to purposefully support teaching and learning. Theme 2 highlighted the value of multimed to support the role of the instructor in online learning. Theme 3 emphasized ways to use multimedia to address student learning needs. Theme 4 provided insight into ongoing issues with teacher training and professional development in online higher education.

Chapter 5 includes a summary and interpretation of the findings from Chapter 4 within the conceptual framework of my study. Chapter 5 also includes a discussion and implications for social change in online higher education, limitations of my study, and

recommendations for future research. Chapter 5 ends with a conclusion related to the

importance of my research study.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this study was to explore the benefits and challenges higher education online teachers experience when integrating multimedia resources into their courses. Gagne et al. (2005) and Davis's (1989) TAM provided frameworks for this study, providing tools for understanding the uses of educational technology during teaching and learning. I chose a qualitative rather than quantitative approach to explore teachers' beliefs and experiences and address the central research question: What are the beliefs of online teachers regarding the benefits and challenges they experience when integrating multimedia resources into higher education courses? Qualitative research is ideally suited to making meaning from the perspectives of others, and responsive interviewing lends itself well to an exploration of teachers' beliefs about multimedia integrations in online higher education (Merriam & Tisdell, 2016; Olafson et al, 2015; Patton, 2015; Rubin & Rubin, 2015; Seidman, 2019). Therefore, three rounds of Zoom interviews were conducted with online higher education teachers to explore teachers' beliefs about multimedia integration. To effect positive social change in higher education, understanding teachers' beliefs regarding multimedia integration in online learning may be used to aide in effective training in multimedia practices related to selecting and integrating multimedia resources, while improving student engagement and providing more individualized instruction (see Clark & Mayer, 2016; Huang et al., 2019; King, 2017; Kolb, 2017; Mayer, 2021; Roblyer & Hughes, 2019; Spector, 2016).

The key findings for this study were presented in Chapter 4 in relation to the central research question in addressing the beliefs of online teachers regarding the benefits and challenges they experience when integrating multimedia resources into higher education courses. The key findings were that multimedia resources need to be purposefully integrated into online curriculum to support learning objectives and outcomes, support teacher presence, support course facilitation, improve the development of relationships and community, and address student learning needs. In addition, teachers expressed a need for additional technical support and specific training related to locating, selecting, creating, and integrating multimedia resources effectively.

Teachers' beliefs about the benefits of multimedia integration in online higher education reflected an understanding of the need to use multimedia to support effective instructional design, specifically through a concern for aligning the selection, creation, and use of multimedia to support learning outcomes and course objectives. Six of the 10 participants had experience as curriculum developers or instructional designers, which can be seen in their beliefs that multimedia should be used to gain and keep attention, motivate learners through fun and engaging experiences, be used to bridge gaps with prior knowledge, scaffold learning, and provide opportunities to practice what they are learning while providing feedback through such instructional activities as video quizzes, games, simulations, and role playing. Teachers' beliefs about multimedia integration also highlighted an understanding that effective teaching requires an understanding of how people learn, how to address the needs of individual learners, and the ability to assess learner knowledge and performance.

Teachers' beliefs about the benefits of multimedia integration in online higher education also reflected an understanding of andragogy, specifically the need to provide real-world, authentic experiences for learners and to provide opportunities for adult learners to make choices about their learning experiences, such as being able to watch or rewatch videos as often as needed, keeping videos short and focused to address difficult concepts or frequently asked questions. In addition, teachers' beliefs highlighted an awareness that learners need different levels of instruction and guidance and individualized instruction as they progress from novices to experts and as they gain competence, confidence, and self-efficacy. Teachers' beliefs regarding the use of multimedia also highlighted an understanding that the role of teachers in online higher education is related to facilitation and curation of the learning resources and activities. Teachers' beliefs also acknowledged a need to address learner anxiety, providing low-stakes opportunities for learners to engage concepts, such as using video quizzes to assess understanding. Teachers' beliefs also revealed that ultimately teaching is about enabling learners to become self-directed, autonomous, lifelong learners. Ultimately, teachers' beliefs about multimedia intregration reflected an understanding that multimedia is intended to support teaching and learning.

Teachers' beliefs about the challenges of multimedia integration in online higher education included the concerns about finding, creating, and using current and relevant resources, providing suggestions related to reviewing and replacing outdated materials frequently. Teachers' beliefs about third party resources integrated into standardized online curriculum highlighted challenges related to effective integration of multimedia

resources, suggesting a need for technical support related to correcting issues with broken links and keeping resources current and relevant. Teachers' beliefs about multimedia integration also highlighted that teachers felt a need for more training related to effective multimedia integration in online learning, specifically related to finding available resources or creating their own resources to address specific course-related topics. Teachers' beliefs resulting from their experiences during the COVID-19 pandemic reflected challenges related to supporting a trend toward providing more synchronous experiences for traditionally asynchronous online learning and providing more asynchronous support for traditional face-to face classes.

Interpretation of the Findings

The findings for this study are interpreted in relation to the literature review in Chapter 2, which included a review of current research related to teachers' beliefs, teaching, and learning, implications of educational technology and multimedia resources, issues related to teacher professional development, and the relationship between teachers' beliefs and practices. Interview conversations with online instructors led me to find additional resources, primarily books, that addressed evolving concerns in educational technology, specifically related to motivating and engaging online learners, teaching and instructional design, online teaching, learner-centered instruction, universal design for learning (UDL), and understanding learning. The findings for this study are explored in relation to the literature review and within the conceptual frameworks of Gagne et al.'s (2005) instructional strategies and concepts for creating the conditions necessary for learning and Davis's (1989) TAM.

Four themes emerged from an analysis of the central research question: What are the beliefs of online teachers regarding the benefits and challenges they experience when integrating multimedia resources into higher education courses? The first theme that emerged related to teachers' beliefs about the purpose of multimedia was related to instructional design: the purposes of multimedia in teaching and learning. The second theme that emerged related to teaching: the role of the teacher in online learning. The third theme that emerged related to learning: addressing student needs. The fourth theme related to teacher professional development and technical support.

The results of my study related to teachers' beliefs regarding the benefits and challenges they experience when integrating multimedia into their courses are consistent with the conceptual framework provided by Gagne, with a review of participant interviews highlighting the need to select multimedia that align with lessons, modules, objectives, competencies, skills, and learning outcomes. Gagne et al. (2005) elaborated a model of learning and memory underlying cognitive theories of learning, highlighting the internal processes comprising the events that occur in the act of learning, concluding that "instruction will facilitate learning when it supports the internal events of information processing" (p. 9). Gagne et al. (2005) aligned each of the nine events of instruction with the internal processes of the learner during the act of learning. The results of my study related to the purposes of multimedia in teaching and learning fit within this conceptual framework. For example, a review of participant interviews highlighted the need to use multimedia to gain and keep attention, making learning fun and engaging, which aligns

with Gagne's first external event of instruction to "provide for attention and motivation"

(see Table 3).

Table 3

Align External Events of Instruction With Activities to Address Internal Learning Processes

External events of instruction	Instructional activities to address internal learning processes
Provide for attention and motivation	Stimulation to gain attention to ensure the reception of stimuli
Present the learning objective(s)	Informing learners of the learning goals to establish appropriate expectancies
Recall prerequisites and related knowledge	Reminding learners of previously learned content for retrieval from long-term memory
Present the new content	Clear and distinctive presentation of material to ensure selective perception
Providing for learner guidance	Guidance of learning by providing suitable semantic encoding
Provide for practice	Eliciting performance, involving response generation
Provide feedback	Providing feedback about performance
Assess performance	Assessing the performance involving additional response feedback occasions
Enhancing retention and "transfer"	Arranging variety of practice to aid future retrieval and transfer

Note. From Gagne et al. (2005) p. 30 (Table 2.2) and p. 10, respectively.

A review of participant interviews highlighted the need to use multimedia to

bridge the gaps with prior knowledge and scaffold learning, aligning with Gagne'sthird

event, "recall prerequisites or related knowledge," that "provides an anchor for new

learning relating what is to come to what the learner already knows" (Gagne et al., 2005,

p.30). The fourth event, "present the new content," emphasized tying new content "to

previous learned knowledge facilitates encoding into long-term memory" (Gagne et al.,

2005, p.30). The fifth event, "provide for learner guidance," is intended "to help make the

content more memorable" and facilitate "encoding and building a rich knowledge structure" (Gagne et al., 2005, p. 30). A review of participant interviews highlighted the need to use multimedia to provide practice opportunities using such strategies as gamification, simulation, and role playing to enhance learning, aligning with Event 6, "provide for practice," with the intent to detect uncertainties or misunderstandings and Event 7, "provide feedback," to provide "information to the learners regarding the accuracy of their understanding" (Gagne et al., 2005, p.30). A review of participant interviews highlighted the need to use multimedia to help assess skills and knowledge and check for understanding, aligning to Event 8, "assess performance," intended to test "delayed retention of learned knowledge or skills" and Event 9, "provide for retention and transfer" and applying "what is learned in different contexts or situations" (Gagne et al., 2005, p.30). In addition, a review of participant interviews highlighted the need to use multimedia to provide authentic, real-world experience, aligning with the purpose of Event 1 to direct attention toward the relevance or purpose for instruction (Gagne et al., 2005, p. 30).

Theme 1. which was related to purposeful integration of multimedia in online teaching and learning, is supported by current literature, which highlighted the importance of deliberate instructional design for aligning learning outcomes and educational and communications technologies. Theme 1 aligned with studies related to intentional planning (see Baudier, 2021; Hickey et al., 2020), developing noncognitive skills (see Pedersen, 2020), scaffolding (see Law et al., 2020), promoting critical thinking (see Bonney & Sternberg, 2017; Halpern & Butler, 2019; Puig et al., 2020), supporting

sociocultural learning (see Frechette, 2020; Young & Asino, 2020), designing for creativity (see McDonald et al., 2020), and assessing learning outcomes (see Davies, 2020; Nilson & Goodson, 2021). Reigeluth and An (2021) highlighted Gagne's (1985) nine events of instruction and hierarchical sequencing, which breaks down complex skills into simpler part-skills as a particularly significant instructional design concept. Reigeluth and An also identified Reigeluth and Merrill's (1999) elaboration theory, which selects and sequences content to optimize the attainment of learning outcomes, Merrill's (2002) first principles of instruction (problem, activation, demonstration, application, and integration), the 4C/ID model (learning tasks, supportive information, procedural information, and part-task practice), and Merrienboer and Kirschner's (2007) 10 steps to complex learning, which further elaborates the 4C-ID model to include specific processes during each instructional design step, as instructional design models that suggest ways to approach to curriculum development and designing the student learning experience.

In addition, Theme 1 highlighted the importance of providing online teaching and learning supports. Theme 1 aligned with current literature associated with the concept of deliberate design of curriculum, providing reminders for learners of the purpose of content and activities, and pointing learners to core objectives (see Darby & Lang, 2019; Inman, 2021; Lang, 2021; Riggs, 2019; Tobin & Behling, 2018). Darby and Lang (2019) pointed out that multimedia selection should be purposeful, noting that decisions should extend from learning objectives. Likewise, Lang (2021) highlighted the importance of thoughtful and strategic design of curriculum and resources matters, highlighting the need

for retrieval practice, interleaving, spacing of learning activities, and aligning practice with assessment. Similarly, Lang (2021) suggested a need to brainstorm a comprehensive list of cognitive skills, prioritize them, and provide opportunities for learners to practice key skills prior to major assessments. In addition, Riggs (2019) believed that good teaching requires requires thoughtful and deliberate course facilitation and design, emphasizing the need to align learning outcomes, assessments, learning activities, and course materials. Riggs suggested that deliberate design helps students make necessary connections between daily activities and learning outcomes. Riggs also emphasized the importance of outcomes-based developments and provided suggestions for finding quality online content, including how to use multimedia and create custom multimedia content.

Theme 1 highlighted the importance of analyzing and understanding learner needs when designing multimedia integrations. Theme 1 aligned with current literature in online teaching and learning associated with motivation and self-efficacy (see Ahn & Bong, 2019; Jones, 2020; Stromie, 2021; Tobin & Behling, 2018), rewards, incentives, and choice (see Anselme & Robinson, 2019; Dey & Gottlieb, 2019; Murayama, 2019; Patal & Hooper, 2019), interest and internal motivation (see Alexander et al., 2019; Ito et al., 2019; Kenninger & Hidi, 2019; Schwartz & Wrzesniewski, 2019; Trautwein et al., 2019), curiosity and boredom (see Goetz et al., 2019; Gruber et al., 2019; Litman, 2019; Mugin et al., 2019; Shin et al., 2019), goals and values (see Canning & Harackiewicz, 2019; Chiew & Adcock, 2019; Niemivirta et al., 2019; Nolen, 2019; Rosenzweig et al., 2019), and methods for measuring motivation and attention (see Ainley & Ainley, 2019;

Fredricks et al, 2019; Kosovich et al., 2019; Linnenbrink-Garcia & Wormington, 2019;

Shell & Flowerday, 2019). More specifically, Tobin and Behling (2018) highlighted the

link between providing students with additional choices and increased levels of

engagement, emphasizing that the "relationship between engagement and student success

is critical to the growth and development of self-efficacy" (p. 83). Furthermore, Jones

(2020) identified self-efficacy as one of the many possible constructs used to indicate

motivation, noting a correlation between self-efficacy and increased engagement. Finally,

Nilson and Goodson (2021) believed that the quality of course design impacts course

completion, recommending the need to use learning outcomes, assessments, teaching

methods, and technical considerations to guide choices about multimedia integrations and

technology choices.

 Theme 1 aligned with Gagne's conceptual framework of instructional design for

this study, emphasizing that clearly defined objectives should guide all media selections

(Gagne et al., 2005). Theme 1 highlighted participant beliefs that multimedia integration

should purposefully match multimedia to lessons, modules, objectives, competencies,

skills, and learning outcomes. Purposeful integrations include using multimedia to gain

and keep attention, making learning fun and engaging, bridging gaps with prior

knowledge, scaffolding learning, providing authentic real-world experiences and practice

opportunities, and assessing knowledge, skills, and understanding. Theme 1 aligned with

current literature related to instructional design of teaching and learning in online higher

education.

Theme 2, which is related to the role of the teacher in online learning, highlighted the importance of deliberate instructional design (Ari et al., 2020; Burdick, 2021; Canning & Harackiewicz, 2019; McCoy & Quinn, 2021) and aligns with current literature that emphasized Reigeluth and An (2021) suggested that instructional theories are informed by learning theories that explain "why an instructional method works in a given situation" (p. 64).

Theme two highlighted the need to use multimedia integrations to support the role of the teacher in online learning. Underlying the conceptual framework of Gagne et al. is the principle that the external events of instruction support the internal learning process of the learner, suggesting that the primary role of the teacher is to facilitate learning through an active process of providing instruction and assessing the effectiveness of instruction. A review of participant interviews is consistent with this conceptual framework and aligns with current literature related to online teaching. One important characteristic of online higher education is that the instructional design, curriculum development, and selection of multimedia resources were often distinctly separated from course facilitation. A review of participant interviews indicated that online teachers often facilitated courses that they did not create or design. The teachers' role shifted from course creator and subject matter expert to a more personal and supportive role, one of mentor and guide rather than sage on a stage. When selecting and integrating multimedia resources into these standardized courses, the teachers' role shifted to clarifying concepts, focusing attention, and addressing student questions and challenges. The teachers' role moved from active lecture to facilitating discussions and course interactions, focusing on

motivation, increasing engagement, providing feedback, assessing performance, and relationship building. With the use of multimedia integrations like video quizzes, the teacher is able to identify gaps in prerequisite knowledge, prior learning, or conceptual models to target difficult concepts. Teachers are able to focus on finding or creating multimedia resources to support these specific topics and learning needs.

Theme two highlighted the role and responsibilities of online teachers (Agarwal & Bain, 2019; Bain, 2021; Gooblar, 2019; Stachowiak, 2020), the importance of active engagement (Boettcher & Conrad, 2021; Darby & Lang, 2019; Persellin & Daniels, 2018), emotion, attention, and motivation (Darby & Lang, 2019; Hidi & Renninger, 2019; Lang, 2021; Riggs, 2019), curiosity (Eyler, 2018; Renninger & Hidi, 2019), and deep understanding (Agarwal & Bain, 2019; Bain, 2021; Eyler, 2018) during instruction. Darby and Lang (2019) suggested that it is important to "actively engage and constantly capture students' attention" (p. 115). Darby and Lang noted that the "emotions that students experience while learning impacts their motivation to engage in the learning itself" (p.153). Darby and Lang also suggested that the "perception of more control can lead to increased motivation to engage" (p. 154). Lang (2021) highlighted emotional arousal as a means to heighten attention and increase cognitive capacities, suggesting "we can capture the attention of students and direct it toward learning by stirring up emotions like curiosity, wonder, joy, and more" (p. 181).

Throughout the interview process, teachers highlighted the importance of sustaining student engagement. Eyler (2018) emphasized that "Our first step in fostering our students' engagement with or rediscovery of their curiosity should probably be

simply to make sure that we are not doing anything to inhibit their curiosity" and helping students to "learn how to formulate questions that urge them toward a deep understanding and engagement with the discipline" (p. 51). Lang (2021) highlighted strategies for teachers to capture attention and elicit emotions of their students, including showing enthusiasm, getting to know students, warming up the language in our communications with students, and considering how to "make a positive difference in the world" (p. 196). Lang emphasized that "small, everyday decisions" can "transform the lives of both teachers and students" (p. 23). Riggs (2019) suggested that "online educators may need to build motivation more intentionally and strategically into the course" and when using multimedia, it should be contextualized to "pique curiosity or emphasize future benefits" (p. 42). Riggs suggested that topics and resources be curated carefully to "improve learning by adding novelty, gaining student attention, and provoking students to consider course topics from fresh perspectives" (p. 67).

Throughout the interview process, teachers discussed online and face-to-face interactions and the use of multimedia integrations to include a reenvisioning of online learning to include more synchrounous interactions. Boettcher and Conrad (2021) stated purpose was to help teachers "reimagine their work considering both the affordances of technology and principles of effective learning" (p. 21). The authors suggested that the differences between traditional and online courses are diminishing because synchronous meeting tools have made interactions between online faculty and students easier, "mimicking many of the interactions in a traditional classroom" and research in human learning has "spurred the development of active teaching and learning strategies, no

matter where we are teaching or learning" (p. 35). The authors highlighted the differences between online and face-to-face instruction, which is incorporating more technology tools for communication and document sharing, indicating that the following characteristics of online learning:

1. The faculty role shifts to increased coaching, guiding, and mentoring.

2. Learners are more active in directing and choosing their own learning experiences.

3. Content resources are more flexible and almost infinite.

4. Learning environments for gathering and dialogue are primarily asynchronous with occasional synchronous meetings.

5. Assessment is continuous. (pp. 36-37)

Throughout the interview process, teachers discussed teacher-learner dynamics, including the shifting role of the teacher and addressing student learning needs. Boettcher and Conrad (2021) divided the online learning experience into four phases centered around the concepts of social, cognitive, and teaching presence. Phase 1 course beginning activities should be designed to build a sense of community for "building knowledge and competencies in learners and building a network of mutual respect and sharing of ideas and perspectives," provide clear expectations for the learner, and generate energy and enthusiasm for the learning experience (p. 113). Phase 2 early middle activities intensify the opening themes and should ensure that learners are engaging with core course concepts and applying them within accessible scenarios and problems. Phase 3 late middle themes include questioning, assessing, project coaching, and empowerment as the

learners "integrate the course knowledge into their personal and customized knowledge structure" (p. 120). Phase 4 closing weeks themes focus on learner independence, reflection, and completion of projects and assignments.

Theme two aligns with Gagne's conceptual framework of the role of the teacher during the events of instruction and the use of instructional materials, resources, and multimedia. Theme two emphasized the importance of using multimedia to support instructional strategies, such as providing introductory videos, mini lessons, and student interactions addressing difficult concepts, as well as assessing student knowledge, skills, competencies, understanding, and engagement. In addition, theme two highlighted concepts such as teacher presence and shifting roles of teachers and learners and aligns with current literature related to integrating multimedia and technology in teaching and learning in online higher education.

Theme three which is related to addressing student learning needs aligns with Gagne's conceptual framework of creating the conditions for learning and emphasized the importance of deliberate instructional design with educational technologies to support adult learners in online higher education. Theme three aligns with current literature, focusing on motivating and engaging learners (Agarwal & Bain, 2019; Bain, 2021; Baylen et al., 2021; Jones, 2020), enhancing self-regulated learning (Azevedo et al., 2019; Broadbent et al., 2020; Hidi et al., 2019), engaging metacognition (Agarwal & Bain, 2019; Bain, 2021; Linder, 2021) developing expertise and expert performance (Boettcher & Conrad, 2021; Hanstedt, 2018; Tormey et al., 2021), enhancing knowledge transfer (Agarwal & Bain, 2019; Bain, 2021; Dohn et al., 2020), and addressing learner

differences (Antonenko et al., 2020; Campbell, 2020; Estes et al., 2020). Reigeluth and An (2021) stated that categories of learning, such as memorization, applying skills, and higher-order thinking are "the foundation for designing effective instruction" (p. 69) and synthesized learning design strategies and theories with instructional systems development to address "dramatic shifts in today's learning landscape" and the need for "learner-centered, project-based, anytime-anywhere instruction" (p. 2).

Theme three highlighted the need to use multimedia integrations to address student learning needs. According to Gagne et al. (2005), addressing individual differences requires a deliberate instructional design process that does the following:

1. Utilize a rational means of reducing the great diversity of individual learner characteristics to a number small enough to make instructional planning feasibile.

2. Identify those dimensions of common learner characteristics that carry different implications for instruction and that can lead to design differences that influence learning effectiveness.

3. Once common learner characteristics have been taken into account, provide a design appropriate for those learner variations that can be shown to make a difference in learning results. (p. 106)

Within the context of multimedia integration in online higher education, multimedia can be used to address a variety of learning preferences of adult learners (Clark & Mayer, 2016; Huang et al., 2019; King, 2017; Kolb, 2017; Merriam & Baumgartner, 2020; Mayer, 2021; Roblyer & Hughes, 2019). A review of participant interviews highlighted

the need to engage adult learners using relevant and timely resources, provide meaningful

experiences that enable individual learners to engage with course concepts and resources

in a variety of ways that give them flexibility and choices to construct their learning

experiences in ways that are challenging, fun, and unique to the learner.

One of the most significant concepts highlighted during interview process related

to using multimedia integrations to get and keep student engagement. A review of

participant responses highlighted concerns related to student motivation and engagement.

Jones (2020) examined motivation and engagement of students using educational

technology to guide educators in applying these concepts in instructional settings. Jones

(2020) noted that there is not one theory that can explain all human motivations,

identifying a list of theories that attempt to examine the relationships between motivation,

learning, and performance, highlighting the ARCS model as an integrative theory of

motivation, volition, and performance. Jones pointed out that motivation is difficult to

assess or measure, since it is a reflection of an individual's intent and therefore must be

inferred from behavior. Jones developed the MUSIC model of motivation to consider

how internal and external variables impact perceptions, motivation, engagement, and

outcomes. Jones' (2009, 2018) MUSIC model identified five principles of motivation to

help instructors develop effective lessons, including empowerment, usefulness, success,

interest, and caring. According to Jones (2020), learners need to be empowered to make

decisions about their learning, feel that what they are learning is useful for attaining their

short and long term goals, believe that they can succeed, be interested in the content and

activities, and believe that others, including the instructor, care about their learning and about them.

Theme three highlighted the concepts of learner-centered instruction (Baudier, 2021; Baylen, 2021; Stachowiak, 2021; Tormey et al., 2021), addressing learner preferences of adult learners (Kolb, 2020; Kolb, 2017; King, 2017), developing a growth mindset and problem solving capabililties (Agarwal & Bain, 2019; Bain, 2021; Hanstedt, 2018; Persellin & Daniels, 2018;), and providing for anytime, anywhere learning (Bracken & Novak, 2019; Estes et al., 2020; Moore, 2021; Tobin & Behling, 2018). Tobin and Behling (2018) suggested UDL as "an approach to the creation of learning experiences and interactions" that allow learners to choose how they direct their attention and engage in learning (p. 13). According to the authors, the "relationship between engagement and student success is critical to the growth and development of self-efficacy" (p. 83). The authors suggested that UDL framework consists of multiplicity, choice, and engagement, suggesting a plus-one approach for developing content and interactions. UDL approaches foster fluid learning principles when designing content and instructional activities for "neutrality, granualarity, portabilitity, interactivity, and ubiquity" (p. 87). *Neutrality* means that content can be accessed through a variety of devices and platforms. *Granularity* encourages content be presented in small units that can be accessed anytime and anywhere. *Portability* means that the content "must be transferable across platforms" (p. 87). *Interactivity* requires active and interactive learning strategies. *Ubiquity* means that learning includes multiple social contexts and authentic learning experiences. Moore (2021) emphasized that the UDL framework may

be used to construct learning experiences are aligned to learner-centered research and best practices.

Teachers' beliefs about multimedia integration emphasized the need to create student engagement. Agarwal and Bain (2019) noted that discussions about technology often focus on engagement, suggesting that "technology can increase long-term learning, higher-order thinking, and transfer of knowledge, not just engagement and motivation" (p. 140). The authors emphasized the importance of exploring cognitive science research, employing effective teaching strategies, and focusing on how students learn through the processes of retrieval practice, interleaving, spacing, and feedback.

According to the authors, retrieval practice has 10 benefits:

1. Improves students' learning and retention of information over the long term

2. Increases students' higher-order thinking and transfer of knowledge

3. Identifies students' gaps in knowledge, which provides formative assessment for teachers and students

4. Increases students' metacognition and awareness of their own learning

5. Increases students' engagement and attention in class

6. Increases students' use of effective study strategies outside of class

7. Increases students' advance preparation for class

8. Improves students' mental organization of knowledge

9. Increases students' learning of related information that isn't initially retrieved

10. Increases students' learning the future by blocking interfering information.

(pp. 45-46)

Weinstein et al. (2019) also pointed out that educators need to "pay more attention to basic research" that "aims to figure our how and why people learn" (p. 19), suggesting that cognitive psychology needs to be "more accessible to teachers, students, parents, and other educators" (p. 26) and overcome common misconceptions about teaching and learning. Weller (2020) traced the history of educational technologies over 25 years, projecting into the future the conceptual frameworks, pedagogies, and social movements that ensure that technology will become "ever more pervasice in the educational process" (p. 192). Theme three highlighted the need to use learning science, neuroscience (Murayama, 2019), and cognitive psychology (Dunlosky & Rawson, 2019; Sawyer & Dunlowsky, 2019; Weinstein et al., 2019) to guide multimedia integration strategies, including providing for retrieval practice, interleaving, and spacing (Agarwal & Bain, 2019; Bain, 2021; Carvahlo & Goldstone, 2019; Persellin & Daniels, 2018).

Teachers' beliefs highlighted the importance of purposeful multimedia integrations. Baudier (2021) maintained that "supporting students in online learning requires intentional planning" and that learning research "stems from a few key concepts: prior knowledge, mastery, memory, and social learning" (p. 90). Agarwal and Bain (2019) highlighted the value of harnessing strategies that decrease anxiety through "desirable difficulties" in which "making mistakes is a good thing" (p. 173). Tormey et al. (2021) stated that "experiential or practical learning is absolutely essential to the process through which students work toward developing expertise in their discipline" (p. 55). Hanstedt (2018) stressed the importance of learners gaining a sense of authority through the active problem solving, suggesting that the combination of content

knowledge, skills development, and attitude can lead to thoughtful change. Bain (2021) highlighted the need for learners to "have an opportunity to try, fail, and receive feedback" (p. 37). Persellin and Daniels (2018) emphasized the value of learners fostering a growth mindset in which failures are viewed as opportunities rather than set backs. Persellin and Daniels also highlighted retrieval practice, spacing, and interleaving as effective learning strategies. Both Hanstedt and Persellin and Daniels highlighted problem-based learning through challenging real-world problems in an educational culture that encourages effort, active reflection, fosters a mastery goal orientation, and transfers of knowledge from one learning context to another.

Theme three stresses the need to use multimedia integrations to address student learning needs in online higher education teaching and learning. Theme three aligns with Gagne's conceptual framework regarding aligning external events of instruction with internal conditions of the learner. Theme three highlighted the need to use timely and relevant multimedia resources to enhance learner motivation and engagement, providing active, authentic, real-world learning experiences appealing to adult learners. Theme three aligns with current literature related to andragogy, learning theory, learner-centered instruction, and UDL.

Theme four which is related to issues associated with training and teacher professional development highlighted the importance of teacher professional development related to educational and communications technologies. Within the context of developing a systems view of technology infusion and teacher professional development, Mishra and Warr (2020) argued that "one can thoughtfully design not just

tools and experiences but also systems and culture" (p. xvii), suggesting that systematic, sustainable change in education "requires attention to all five spaces of design: artifacts, processes, experiences, systems, and culture" (p. xix). Foulger (2020) emphasized the need for technology-infused teacher preparation programs that emphasized that "technology integration is addressed by *all* instructors in a program-deep and program-wide manner," highlighting ISTE standards and the 2017 National Education Technology Plan (NETP) that training with educational technology should extend beyond a single educational technology course, but teacher education programs should be restructured to infuse technology throughout their educational experiences (p. 3). Foulger highlighted the Technology Pedagogical Content Knowledge (TPACK) framework as a conceptual framework for technology infusion in teacher education programs, insisting that teacher training include learning experiences that model innovative uses of technology, opportunities for practice integrating technology in a variety of settings, and the development of self-efficacy and intentionality for technology integration in their future courses.

Teachers' beliefs highlighted the need for training in using multimedia effectively to support teaching and learning. Muller (2020) stated that "infusion is an approach to teaching about technology integration that results in teacher candidates being effective with integrating technology" (p. 29). Muller concluded that "the ultimate goal of technology infusion in teacher preparation programs is well prepared, versatile, skilled, and compassionate educators – grounded in the science of teaching and learning" (p. 45). Nussbaum-Beach (2020) noted that the "technology revolution has found its way into

every area of society" (p. 59) and that educators should not just use technology in creative ways but should master the appropriate technology to personalize learning and "produce future ready learners" (p. 61). In addition to planning for technology infusion in teacher education programs, the implementation of technology infusion should include frameworks that scaffold learning to teach with technology (Kolb, 2020), develop teacher educator competencies (Slykhuis et al., 2020), and prepare teacher candidates to teach online (McVey, 2020). Evaluating effective technology infusion in teacher education programs should include leadership efforts to guide and sustain change (Clausen, 2020) and frameworks for evaluating and assessing technology infusion efforts, such as TPACK, the self-efficacy perspective, the Theory of Planned Behavior, and the Decomposed Theory of Planned Behavior (Buss, 2020).

Theme four highlighted the need for training, professional development, and technical support when integrating multimedia resources into online courses. Davis (1989) TAM model provided a conceptual framework for understanding teachers' beliefs related to the benefits and challenges of multimedia integration of online higher education. The constructs of perceived usefulness and ease of use provided a means for understanding the value instructors placed on multimedia integration. Teachers' beliefs highlighted the perceived usefulness of multimedia integrations by enabling teachers to address a variety of teaching and learning purposes. A review of participant interviews highlighted the benefits experienced when integrating multimedia into teaching and learning. Yet, a review of participant interviews also highlight the challenges associated with multimedia integrations, a view supported in current education research. For

example, Agarwal and Bain (2019) stated that the "science of learning sits dormant in academic journals rather than easily accessible in pre-service textbooks and professional development materials" (p. 20). Teachers identified challenges associated with locating and selecting resources to enhance course facilitation, specifically associate with ensuring current and relevant resources and managing third-party resources and links that failed to be maintained. Teachers highlighted that managing multimedia resources within today's learning management systems are getting easier and training in using LMS tools and resources does occur, but a review of participant interviews highlighted concerns that training specifically related to best practices for multimedia integrations and effective teaching and learning strategies are needed. Boettcher and Conrad (2021) identified core principles, best practices, and guidelines for choosing and using technology tools for higher education teachers, integrating theories that emphasize that "learners actively construct and create their personalized knowledge structures" and "the role of context or environment of learning" (p. 41).

Theme four revealed the need for technical support with maintaining relevant, timely, and engaging resources, training related to best practices and strategies for multimedia integration, training related to teaching and learning, and training related to finding, using, and creating multimedia resources. Theme four aligns with Davis' TAM conceptual framework for this study and current research related to teacher professional development and multimedia integration in online higher education.

The results of this study provide a better understanding of teachers' beliefs, add to the current literature related to multimedia integration in online higher education, can

help teachers, instructional designers, and online leaders make informed decisions about integrating multimedia in teaching and learning, and provide insight into teacher training and professional development related to best practices when selecting, integrating, and using multimedia resources.

Limitations of the Study

The limitations of this study are related to the potential weaknesses of the study design. One of the limitation is related to the sample size. My study consisted of three rounds of Zoom interviews with 10 online higher education teachers. The teachers had varying levels of experience teaching online and some teachers with additional administrative or instructional design roles that influenced their teaching practices. The findings of my study provide a valuable insight into the beliefs and experiences of some online teachers, but the results should not be generalized to all online teachers' beliefs and experiences. My goal is to provide rich descriptive data within the small sample size. Interested stakeholders should determine how much of the findings of this study can apply to their own contexts.

Another limitation of this qualitative interview study was researcher bias. When interviewing participants, the need to check my understanding of what participants lead me to summarize or paraphrase participant responses. As a researcher, I needed to ensure that I am understanding what the participants were telling me without injecting my own knowledge, experience, and beliefs into my conversations with participants. To mitigate this concern, in the first interview, I attempted to ask the interview questions without commenting on participant responses. The round two and three interviews were more

conversational, enabling me to dig deeper and explore participant beliefs and experiences.

Qualitative research is assumed to be subjective and dependent on researcher interpretation (Ravitch & Carl, 2016). This study is an exploration of teachers' beliefs with the intention of gaining insight into multimedia integration in online higher education. Participant beliefs and researcher interpretations cannot be generalized to all online teaching and learning contexts. This study focused on andragogical principles so it may not necessarily be applicable to primary and secondary education settings.

Recommendations

The following recommendations for further research are grounded in the principles of instructional design, literature related to teaching, learning, elearning, multimedia learning, and educational psychology. The results of my study highlighted the relationship between teachers' beliefs and practices regarding multimedia integration in online higher education. The four themes identified highlighted teachers' beliefs about effective, efficient, and engaging uses for multimedia in instructional design, for supporting the role of the teacher, and addressing individual learner needs, and designing professional development for online faculty. Teachers' beliefs about the benefits of multimedia integrations highlighted the benefits associated with multimedia integrations for enhancing the student learning experience and improving course facilitation. Teachers' beliefs about the challenges of multimedia integration highlighted the challenges of online teaching and learning experience to stay relevant, provide for authentic experiences, and provide for more effective teacher training. Further research is

needed related to effective training and professional development practices associated with multimedia integrations in online higher education. Additional research is recommended to explore students' beliefs about multimedia integrations in online higher education, to explore the benefits and challenges of multimedia during their learning, how it impacts their perceptions of their teachers and influences engagement and motivation during learning.

Implications

The results of this study and the teacher beliefs presented may have the potential to inform educational stakeholders regarding the nature of multimedia, effective uses of educational technology, and the changing contexts in higher education as more educational technology is being employed resulting from COVID-19 pandemic responses. As highlighted in participant interviews, teachers are expected to use more synchronous approaches to address the needs of online students and use more asynchronous approaches to address the needs of face-to-face courses unable to meet because of pandemic restrictions. The results of this study have implications within the context of online higher education, regarding the uses of multimedia integrations to encourage pedagogical change (Bracken & Novak, 2019; Burdick & Hellman, 2021; Clausen, 2020; South & Song, 2020; Stephens & Vaughn, 2019; Stromie, 2021) support teaching and learning core principles and best practices (Bain, 2021; Boettcher & Conrad, 2021; Darby & Lang, 2019; Lang, 2021; Riggs, 2019), and regarding the uses of multimedia to support the social contexts of learning. Teachers' beliefs about multimedia integrations have implications related to defining effective, efficient, and engaging

resources within the context of instructional design (Huang et al., 2019; Mayer, 2021; Merrill, 2020; Roblyer & Hughes, 2019), within the context of adult online learning (Clark & Mayer, 2016; King, 2017; Kolb, 2017; Merrill, 2020, Mayer, 2021; Spector, 2016) and educational psychology (Darby & Lang, 2019; Jones, 2020; Lang, 2021) and choosing educational technology (Boettcher & Conrad, 2021; Huang et al., 2019; Magana, 2017; Roblyer & Hughes, 2019;).

The findings of this study may impact online higher education as stakeholders adapt multimedia integrations to create more real-world, authentic learning experiences better suited to meet the needs of adult learners. The findings suggest opportunities to adapt multimedia integrations to foster meaningful teaching and learning apprenticeships, moving learners through the spectrum from novice to expert as they are guided through more challenging experiences and assume greater authority over their own learning. The findings highlight the need to find effective, efficient, and engaging ways to use multimedia integrations to improve levels of student engagement and provide more learner-centered, individualized instruction. Multimedia integrations can be used to provide immediate feedback and self-assessments for learners through a variety of methods, including knowledge checks, simulations, and gamification techniques. Keeping multimedia integrations relevant and addressing carefully designed learning outcomes is essential to creating meaningful learning experiences. Knowledge gained from this study may also be used to inform online teaching and learning practices and strategies and improve technical and instructional support associated with teacher training and professional development. Better understanding teachers' beliefs about multimedia

integration in online higher education can positively impact student lives, improve teacher performance, and provide insight into teacher professional development, instructional support, and technical training required to improve online higher education.

Conclusion

Online education is evolving, and an understanding of teachers' beliefs about multimedia integration in online higher education provide insights into the nature of multimedia as a means for addressing individual learning needs and designing learning experiences for adult learners. Current literature and participant responses highlight the need for purposeful use of technology in an ongoing paradigm shift toward a learner-centered, andragogical approach to teaching and learning that addresses the goals of the 21st Century digital age to create lifelong learners capable of solving real world problems that do not yet exist. The role of the teacher in online higher education is essential for moving the adult learner toward attaining a sense of authority as they move from novice to expert performance. As teachers use multimedia to curate content, create a fundamental human connection necessary for learning, and enable timely and relevant feedback and assessment, learners are provided learning experiences essential for mastery learning and transfer of knowledge to new and as yet unforseen contexts. The four themes highlighted in this study of teachers' beliefs regarding multimedia integration in online higher education emphasize the importance of aligning technology with andragogy, employing effective teaching and learning strategies informed by educational research, and suggest opportunities for supporting online teachers with effective training in instructional design and technology integration.

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